

# Railway Age Gazette

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### GENERAL NEWS SECTION.....

\*Illustrated.

IT now seems certain that the full crew law passed by the Missouri legislature at its last session will not go into effect until the people of the state have had a chance to pass on it. As already noted in these columns, the railways have been circulating a petition asking for a referendum vote on the measure; and they have now secured the number of signatures requisite to having it put on the referendum ballot. Save for this appeal to the people the law would have gone into effect on June 24. The referendum vote will not take place until October, 1914, and the initiative petition renders it inoperative until after that time. The Missouri law applies to crews of both passenger and freight trains. It prohibits any railway from operating any passenger, mail or express train wholly within the state that is not equipped

with a crew consisting of at least an engineer, fireman, conductor and flagman, or to operate any passenger, mail or express train of six cars or more that is not equipped with a crew consisting of at least an engineer, fireman, conductor, flagman and brakeman. As to freight trains, it prohibits the operation of any train composed of less than 40 cars without a crew consisting of at least an engineer, fireman, conductor, flagman and brakeman, or any train composed of 40 cars or more that does not have behind the engine a crew consisting of at least a conductor, flagman and two brakemen. Freight trains doing local switching, or loading and unloading local freight, must also have crews behind the engine consisting of at least a conductor, flagman and two brakemen. The law does not apply to railways less than 45 miles long, or to relief or wrecking trains, nor is it operative during strikes of men in train service. The most expensive provision, of course, is that requiring crews including at least a flagman and two brakemen on all trains 40 or more cars long. The railways have estimated that compliance with the act would increase their annual operating expenses more than \$500,000, this estimate being based on the number of trains on which they would have to put an additional brakeman and on the average wages paid to this class of employees. The referendum law gives ample time for full discussion of the important questions raised by such legislation as this.

THE first comprehensive telpherage system installed in this country for handling L. C. L. merchandise at freight houses was that which has been in use in the Missouri, Kansas & Texas double-deck freight house at St. Louis, Mo., since 1911. The management has now decided to take out this system and substitute for it a trucking system, using elevators. Without in any way suggesting agreement or disagreement with the reasons which have influenced the M. K. & T. in their decision to abandon the telpherage system, it is interesting to enumerate the principal of these reasons. Of course, the immediate cause was the fact that the expenses since the establishment of the telpherage system, which was described at some length in the *Railway Age Gazette* of June 23, 1911, page 1647, had been steadily mounting until at present they are considerably over 50 cents a ton. This is exclusive of interest charges on the plant itself. The reasons given for these increases in costs are first, that it was never feasible to carry out the scheme for which the telpherage system was originally designed. This scheme was that the telfers should pick up a loaded truck on one platform and move it to any other platform in the building. It was found absolutely impossible to operate the telfers in this way, where the weights of loads and character of merchandise vary so widely, and where the time consumed in loading and unloading trucks was so different for different characters of loads. The telfers got in each other's way and the congestion and confusion was fatal to quick and accurate handling. The telfers at the present time are being operated parallel to the platform only and after the freight is lowered through the hatch ways to the lower floor of the freight house it has to be trucked from there to the proper car door, which may be on some other platform. This, of course, comes very nearly adding the expense of operating the telpherage system to the expense that would be incurred in any case in trucking the freight. This impracticability of using the telpherage system in the way in which it was intended would probably in itself have been sufficient to lead to the decision to abandon it.

A SECOND objection has been found. In theory it would seem that the larger the truck load that could be handled the greater the economy, and under the telpherage system a large two-ton truck on four wheels, setting up 4 to 6 in. above the floor, is used. In practice the time consumed in loading from the platform on to this truck all sorts of articles, some so heavy as to be impossible of loading by one man, and unloading these same articles again outside the car—for it was found that

in properly loading the car the large truck could not be wheeled into it after the first few bundles of freight had been stowed—was so great as to more than offset the theoretical economy of the larger truck. The first difficulty, that of the design, may, of course, be simply due to the design of the particular plant installed at St. Louis and may not be a valid reason against the adoption of telpherage systems by railroads at other or differently designed freight houses. The second objection is more nearly fundamental. The experience of one set of men in charge of one particular telpherage system is by no means enough on which to base a conclusive opinion as to the possibilities of the telpherage system, but, as was previously pointed out, it is interesting. The system which is to replace the telpherage system will be that of hand trucking, with elevators carrying the loaded trucks from the upper floor to the lower one where the cars are loaded. It is believed from experience that a man with a hand truck can handle nearly all of the varieties of packages which are sent in L. C. L. lots. The idea is to eliminate so far as possible all waiting by the truckers. A man will pick up his two-wheel hand truck load, take it to the proper elevator, run the truck on to the elevator, pick up an empty truck and go back for another load. The elevators are designed for four hand trucks and the trucker on the lower level will take a loaded truck from the elevator, run it to the car door or into the car, drop it and pick up an empty truck and run it back on to an elevator.

**B**EGINNING June 23 the number of express trains daily, except Sunday, each way between New York and Boston will be increased to 18, the Boston & Maine having announced that its new Bondsville route will be opened on that day, with two through trains, starting from both termini at about 11 a. m. and 11:30 p. m. Ware, Barre, Oakdale and Hudson—is any New York traveler able to locate these towns accurately on the map?—will then become express stations. Also Waltham, the home of J. O. Fagan. The trains will run through in six hours, the distance being about the same as via Worcester or via New London (232 to 234 miles). The 18 trains will start from New York at 8:00, 8:14, 9:15, 10:00, 10:02, 10:50, 12:00, 1:00, 1:02, 2:00, 3:00, 4:00, 5:00, 5:33, 11:10, 11:33, 12:00 midnight, and 1 a. m. The "Air Line" through Middletown, which once was exploited as the *only* rational route for New York-Boston travelers who really desired to properly economize their time, must now feel exceedingly small and disheartened. Not one of the 18 trains goes through Middletown. Lines running through large cities, with the facilities of double track, possess advantages which outweigh a matter of 20 miles in distance as surely as a ton of coal outweighs a mile of telegraph wire. Providence, New London, Hartford, Springfield and Worcester have long since secured these advantages. The smaller places above named will now get the advantage of through trains, not by their bigness, but by the bigness of Mr. Mellen's plans for utilizing the Central Massachusetts division of the Boston & Maine. He proposes also to run through cars three times a day from Northampton south through Holyoke, 18 miles to Springfield and thence east to Boston, and vice versa, so that citizens of Northampton or Holyoke who have the hardihood to use the Boston & Albany will, no doubt, henceforth be hard to find. An old-time phrase is brought to mind in the declaration of Vice-President Campbell, of the New Haven road, that the Boston & Albany will have to yield that part of the traffic between Springfield and Boston "to which the Boston & Maine is fairly entitled." It will be "entitled," of course, to all it can get, by giving good service and low prices. However, old style methods of securing "title" to traffic have been largely done away with, and the coming strife will be very dignified and orderly, no doubt. The new link from Bondsville to Springfield, 16 miles long, is termed by Mr. Mellen a "bridge"; its local traffic will be too small to count. The line has cost \$4,000,000, or \$250,000 a mile; and even at that the trains will have to use about two miles of the Boston & Albany main line at Springfield.

## SOME DISPUTED POINTS IN RAILWAY VALUATION.

### 4—Intangible Values.

**U**NDoubtedly the most difficult items to appraise properly are those intangible elements commonly grouped under the term, "going value." Much attention has been paid to these items in the valuation of public utility properties, and the courts have often decided that a company is entitled to a valuation that shall include an allowance based on the fact of its existence as a going concern. In railway valuations the practice with reference to intangible values has varied, largely because of the different purposes of the valuations and also because of the difficulty in arriving at these values. The organization for the soliciting and transportation of business gives an old line a market value in excess of one of the same physical value which has just been completed. Again, the strategic position of the Pennsylvania in Pittsburgh, of the New York Central in New York City, of the Burlington at several large centers of the other Hill lines at Seattle, is reflected in the earnings of these roads. Many other considerations of a similar nature might be enumerated.

In the Michigan valuation, made in 1900 for the purpose of taxation, \$35,814,043 was allowed for the non-physical or intangible values. This figure was arrived at by capitalizing at 7 per cent. the average surplus for the period of ten years next preceding the valuation, which was equivalent to a net income of 6 per cent. after the payment of a tax of 1 per cent. In other words, this valuation took into consideration the effect of the earning power of a road upon its market value. In Wisconsin no allowance was made for intangible values, although subsequently in the hearing in the two-cent fare cases, the Railroad Commission conceded that these values existed and should be taken into consideration in deciding upon the reasonableness of rates.

In Washington, this subject was considered at length and interesting conclusions were drawn. The density of population tributary to the line; the density, class and permanency of traffic; the facilities for doing business; the grades and curvature; fuel supply and other conditions affecting operating expenses—were all considered. In the cases of the Northern Pacific and Great Northern in Washington, it was shown that the business would naturally tend to increase and the market values were estimated at about 1 per cent. above the cost of reproduction in the case of the Northern Pacific, and between the cost of reproduction and the depreciated value in the case of the Great Northern. The market value of the Oregon Railroad & Navigation Company was likewise estimated at more than 20 per cent. in excess of the cost of reproduction. On the other hand, the Bellingham Bay & Great Eastern being dependent for traffic almost entirely upon forest products, one-half of which had been removed at the time of the valuation, the market value of this road was estimated at slightly less than half its cost of reproduction new.

In New Jersey the tax law under which the valuation was made provided that all intangible elements, including the increased cost of land when used for railway purposes, should be valued in one group. The method adopted was similar to that used in Michigan, the surplus being capitalized at 7.896 per cent. (6 per cent. plus a tax rate of 1.896 per cent.). The total intangible value for all roads was fixed at \$75,841,600, or 20 per cent. of the total valuation. As this amount was practically equivalent to the amount deducted for depreciation, it left the present value, including intangible values, practically equal to the cost of reproduction new or about the same result as was arrived at in Michigan.

On the other hand, in the Minnesota valuation, and in the Massachusetts valuation of the New Haven, no cognizance was taken of intangible values. In the Massachusetts valuation, however, Professor Swain discussed the value to the New Haven of its perpetual trackage rights over the New York Central & Hudson River from Woodlawn into the Grand Central Terminal, and placed this at \$6,000,000. For the purpose of his valuation,



however, which was to justify the securities of the New Haven, this item was omitted from the totals, as no capital had been issued against these trackage rights.

#### THE ST. LOUIS & SAN FRANCISCO AND ITS BANKERS.

THE rather sudden creation of the receivership of the St. Louis & San Francisco brings up some rather interesting questions in regard to the relations between railroad companies and their bankers. The policy of the various railroad companies in this respect has differed widely. The New York Central & Hudson River, when there was a rumor that it was about to change its bankers a few years ago, made the positive statement that J. P. Morgan & Co. had been and would continue to be its sole bankers. The Southern Railway likewise apparently has the fixed policy of selling its securities through Morgan & Company. On the other hand, the Pennsylvania Railroad has not hesitated in the past to award an issue of new securities to any strong banking syndicate which would pay the price, which the Pennsylvania directors considered fair. E. H. Harriman at one time, objecting to the price which Kuhn, Loeb & Company asked for their services as underwriters in the sale of Union Pacific securities, sold these securities directly to bankers and investors in Europe and the United States.

Some of the main facts in the history of the St. Louis & San Francisco's banking relations in the last two and a half years, insofar as it has been made public, are substantially as follows: In January, 1911, Speyer & Co., New York, bought from the railroad \$7,000,000 15-20 general lien 5 per cent. bonds, offering them to the public at 87, yielding the investor  $6\frac{1}{4}$  per cent. Before the end of the month it was announced that the bankers had disposed of all of their holdings. In April of the same year Speyer & Company sold 35,000,000 francs (\$7,000,000) of these 15-20 year general lien 5's to French bankers; the price which the company received for its bonds not being made public, but the offering price in France to private investors being considerably higher than 87, the offering price of the bonds sold in this country in January. Later in April, 1911, the company paid off \$4,000,000  $4\frac{1}{2}$  per cent. notes, and during that same month a syndicate was formed, headed by William Salomon & Co., New York, and G. H. Walker & Co., St. Louis, Mo., to underwrite an issue of New Orleans, Texas & Mexico division first 5 per cent. bonds, of which \$5,000,000 were taken by these bankers at this time. In May, 1911, the company sold \$2,500,000 2-year 5 per cent. notes dated June 1, 1911, to F. S. Moseley & Co., New York and Boston, which notes were offered to the public on a basis to yield  $5\frac{1}{2}$  per cent., and which notes are the ones which the railroad company has now found itself unable to refund. In July, 1911, the railroad company called for payment \$4,000,000 notes callable in 1911, but not due until 1912. In August, 1911, Speyer & Company bought \$3,000,000 equipment trust notes, the selling price of which was not announced at the time. In September, 1911, the Guaranty Trust Company bought and offered to the public at par \$1,776,000 5 per cent. equipment notes, and later in the same month the "Frisco Refrigerator Line" was formed, which bought a certain amount of equipment and presumably issued securities through some bankers to pay for this.

In October, 1911, it was announced that the Frisco had acquired a part interest in the New Orleans, Mobile & Chicago, and a little later it was announced that a trackage agreement for which the Frisco had been negotiating with the Missouri Pacific and the St. Louis, Iron Mountain & Southern had fallen through, and that a trackage agreement had been made with the Louisville & Nashville, which had taken an interest in the New Orleans, Mobile & Chicago. In December, 1911, Speyer & Company bought from the railroad and offered to the public at 89, yielding  $6\frac{3}{8}$  per cent., \$2,553,000 15-20 year general lien 5 per cent. bonds. Later in the same month the railroad company announced that it intended to build its own line from Port Barre, La., to a connection with its New Orleans-Houston line, apparently in con-

sequence of the failure previously mentioned to make trackage arrangements with the Gould lines. In January, 1912, \$3,122,000 15-20 year 5 per cent. bonds were listed on the New York Stock Exchange, and additional bonds were sold in France. In April, 1912, William Salomon & Co., and G. H. Walker & Co., offered at 95 \$12,300,000 New Orleans, Texas & Mexico division first 5's, and at this time it was announced that in all this syndicate had bought \$28,300,000 of these bonds, the railroad company at that time paying off \$8,000,000 notes. In May Speyer & Company sold \$3,000,000 additional 15-20 year 5's in France, and at that time it was announced that in all 100,000,000 francs (\$20,000,000) of these bonds had been sold in France. It was in May that the decision of the lower courts was confirmed deciding that the railroad company could not issue certain of its bonds for general purposes which had been set aside for refunding purposes. In August Speyer & Company bought \$2,250,000 "Frisco Construction Company" 5 per cent. equipment notes, and in September the Salomon-Walker syndicate took from the company \$2,600,000 2-year 6 per cent. notes secured by New Orleans, Texas & Mexico bonds. In November the Salomon-Walker syndicate offered to the public at par \$1,000,000 Quanah, Acme & Pacific 6 per cent. bonds guaranteed as to interest by the Frisco, and also carrying a guarantee of redemption by July 15, 1921, at 105 by the Frisco.

It is sometimes true that a railroad company suffers in its operation through interference in management by its bankers. It is also sometimes true that a railroad company has to pay a price which its directors may consider too high if it deals always with one banking house. It may quite possibly have to pay a somewhat higher price to this banking house if it offered its securities for competitive bidding. On the other hand, railroad securities have never, so far in the history of the United States, been sold successfully on a large scale and over an extended period without the co-operation of banking interests. There is another fact which has to be taken into consideration. If one banking house is the recognized agent through which a railroad company is to sell its securities, the credit of that railroad company becomes of vital interest to the bankers. This has its drawbacks, as has already been mentioned, when it leads to interference with the management. In times of stress, however, when money is hard to obtain, the fact that the bankers have sold to their clients the securities of a road of which they are the recognized agents makes it morally imperative for these bankers, insofar as they can, to protect their clients, and in so doing necessarily tide over, if possible, the railroad company.

Here is where the difficulty lay in the St. Louis & San Francisco case. Speyer & Company claimed that they were perfectly willing to help further finance the Frisco, but that they were not willing to bear the entire burden. It is significant that the notes which the company was unable to refund were an issue sold to an outside banking firm. The bankers' first duty, of course, is to their customers who have trusted in their judgment in making their investments. It is quite possible that in the case of the St. Louis & San Francisco the bankers believed that the best interests of their clients could only be preserved through permitting the road to go into the hands of a receiver and so disentangle itself from certain of its obligations, such as the guarantee of dividends on the C. & E. I. stock. Of course, other explanations of the rather sudden receivership can be offered. One thing, however, appears to be clear: the interests of all parties can best be conserved by a continuance of the effective and economical operation of the railroad. In the interests of the security holders and of the public served by the Frisco, no financial disagreements ought to be permitted to interfere in any way with the best possible operation of the railroad as a railroad.

Through an unfortunate inadvertence the phrase "unlike the receivership of the Missouri Pacific," etc., was used in the editorial in the *Railway Age Gazette* of May 30, discussing the receivership of the St. Louis & San Francisco. Of course no receiver has been appointed for the Missouri Pacific, and the ref-

erence to it in this connection was a complete mistake which we keenly regret.

#### THE PRESS AND PROPOSED ADVANCES IN FREIGHT RATES.

THE tone adopted by the newspapers in discussing the proposed advance of 5 per cent. in freight rates in eastern territory is a striking and conclusive proof of a great change in the attitude of the public toward the railways which has occurred within the last few years. When the railways sought to advance their rates in 1908, and in 1910, they were severely criticised by the press both for this and for the general policy of many of their managements. The petition of the eastern roads for an advance in rates which has just been filed with the Interstate Commerce Commission has been received in an entirely different spirit. Newspapers which three years ago denounced the railway managements for faults of omission and commission, now frankly concede that in recent years most of the managements have been doing their best to operate economically, and at the same time meet the reasonable demands of the public. Publications which then flatly opposed any advance in rates as being unnecessary and unwarranted, now grant that the floods and other adverse natural conditions from which the roads have suffered, the general advances in wages that they have had to make, the rise that has occurred in the rate of interest that they must pay, the decline that has come in the value of their securities, and the brake that has been put on new construction and permanent improvements, have changed the entire situation and made the petitions for higher rates appear much more reasonable than did the similar petitions formerly presented. The following quotations are typical of what the newspapers are saying:

*Philadelphia Public Ledger*: "When the Interstate Commerce Commission takes up this freight rate request it is bound by every instinct of national welfare to consider it in the broadest possible way. The pastime of bullying railroads has ceased to be popular, because it is too dangerous. The commission can do the country a very exalted service by dealing justly with the railroads without any unnecessary delay."

*Chicago Tribune*: "The resort of the Frisco and the Chicago & Eastern Illinois railroads to receivership, while it is not to be interpreted as significant of railway conditions in general, emphasizes the heavy pressure under which railway management has been raising a voice of protest and warning. . . . This has had, thus far, a less serious effect upon the general business situation than might have been expected, but it is now more important to consider whether the country's vital interest in ample and efficient transportation does not demand some prompt relief of conditions making for the extreme conservatism referred to. This relief, it would seem, must come if at all in the form of a reasonable but sufficient advance of freight rates. When this demand was made by the railroads two years ago the public opposed it because it was felt that the railroads had not made a case and did not come into court, as it were, with clean hands. . . . Since that time the railroads have placed themselves in a rather better position. They have by no means removed all the grounds for fair objection to their finance, their administration or their politics. But reforms have been instituted and economies achieved and there has been a desirable and profitable toning up of policy from the point of view of the public service."

*Chicago Inter Ocean*: "The most obvious remedy for the relief of the railroads is an increase in their rate charges. When this increase was proposed by the railroads a few years ago there was a general outcry in opposition. Has not the time arrived when it is plain that a small increase in rates will avert more serious conditions?"

*Saturday Evening Post*: "For three years railroad expenses have been quite steadily increasing in a ratio greater than the increase in revenue. Advance in wages recently secured by firemen and engineers will, of course, still further augment expenses. Other wage advances will be demanded. One of the strongest railroad bond issues ever brought out in this country was offered to the public only last month at better than 4½ per cent., and only a portion of it was taken. Roads of first class financial standing are paying 5½ and 6 per cent. on short-term notes for capital to meet their requirements. Weak lines are paying pawnbrokers' rates. There is no reason to presume that labor, supplies and capital will cost less. The presumption is the other way. We do not think it should be the policy of the government that the roads are never under any circumstances to be granted an increase in rates. They are entitled to an impartial judgment on the facts, and we have no doubt they will get it."

*New York Evening Mail*: "It is not merely the falling prices of railroad securities in the stock market that signal the danger of the present iron policy of restricting railroad rates. The refusal of the public both here and in Europe, to invest money in new bonds or other securities of the foremost and best-managed American railroads, save at almost prohibitive

prices, shows that we have passed the line of prudence and reason in restricting the profits of our transportation systems."

✓ *Philadelphia Record*: "The interests of the railroads and the public are identical, for one cannot suffer serious losses without the other being greatly affected. The present situation calls for fair and just treatment of the railroads if future trouble is to be avoided."

✓ *New York Tribune*: "The public is interested not only in seeing that the railroad workers receive a living wage. It is interested even more vitally in seeing that the railroads receive a living wage. The railroads must earn enough for their own upkeep. They must earn enough to have a surplus to put into non-dividend paying improvements, for the public demands them. They must earn enough to grow as the country grows."

✓ *New York American*: "The granting of the eastern railroads' application for (5 per cent.) higher freight rates would have immediate and marked effect in restoring confidence in railroad securities. Not a few railroad bonds are now at panic prices, while stocks in several prominent instances are at the lowest levels in recent years. The costly floods and the adoption of higher wage scales have aggravated the situation."

✓ *New York Herald*: "Unless they are promptly permitted to increase their charges they cannot continue to supply efficient service even on the present basis, and are assuredly unable at this time to comply with the unreasonable demands of employees, involving further enormous increase of operating cost."

✓ *Philadelphia Bulletin*: "It is to be recognized that the general railroad business of the country is not in a condition to stand further increases of expenses without being granted a right to additional earning power."

✓ *Boston Post*: "The public will have to chip in a bit for the increased pay to employees, and we believe it is perfectly willing to."

*St. Joseph (Mo.) Gazette*: "Restrictive conditions have been overplayed in some states. Railroad expansion is most completely at a standstill. Let us take stock of the results of the restrictive and hampering legislation we have subjected the railroads to for a generation, and see if it is not barely possible that we have overdone it."

*Perth Amboy (N. J.) Evening News*: "It is not surprising that the railroads have announced their intention of asking the Interstate Commerce Commission for the right to increase rates, and we believe the public will sanction granting the same."

*Springfield (Mass.) Republican*: "Much has been made of the claim that greater efficiency in running railroads would increase their revenues, but unless we are to assume the grossest kind of laxness hitherto, this alone would not produce earnings sufficient for the emergency. We cannot be justified in regulating railroads to death. The railroads are likely to find the Interstate Commerce Commission much more favorably disposed than once toward some measure of relief."

*Dallas (Tex.) News*: "The argument which the railroads make is pretty well linked together, and the links, to the superficial view, at least, appear to be made out of something like flawless metal. It is for the commission to determine whether they are or not. At least they make out good enough prima facie case to entitle their request to deliberate and unbiased consideration."

The change in the attitude of the press reflects the change that has taken place in the attitude of the public. The change in the attitude of the public has been brought about, first, by more circumspect and efficient management of railways, and, second, by the policy followed by the railways in recent years of frankly and squarely meeting in public discussion every issue affecting them that has been raised. As the *Chicago Tribune* says, "the case for the railroads has been pressed through legitimate publicity, and public opinion unquestionably is more favorable than it has been for many years." This more favorable attitude on the part of the public could not have been brought about without full and earnest presentation and defense of the railways' case to the public; but it is also emphatically true that it could not have been brought about if the railways had not had a good case to present and defend; and they had so good a case chiefly because their managements have been doing in recent years very few things that invited just criticism.

#### NEW BOOKS.

*Principles of Irrigation Engineering*. By Frederick H. Newell and Daniel W. Murphy. Size 6 in. x 9 in., cloth binding, 293 pages, 16 plates and 54 ills. Published by McGraw-Hill Book Co., New York. Price \$3

The authors of "Principles of Irrigation Engineering" are respectively the director and engineer in charge of drainage of the United States Reclamation Service, which stamps their writing with a degree of authority. The book is intended to cover not only the construction and operation of irrigation works, but the broader question of the feasibility of constructing such systems. It is designed to interest the statesman concerned with questions of public welfare and the capitalist seeking an investment, as well as the engineer who is called upon to plan the engineering work.



# THE AUTOMATIC TRAIN STOP PROBLEM.\*

Exposition of the Difficulties Encountered in Adapting  
Automatic Stops to Miscellaneous Railroad Service.

By A. H. RUDD,

Signal Engineer, Pennsylvania Railroad.

Automatic stops are not a "cure-all" for the dangerous features of railroad operation. They will not prevent derailments due to failures in rolling stock, track or bridges, or to excessive speed, washouts or landslides. . . . They may prevent collisions and excessive speed over short crossovers. While some automatic-stop systems have indicators in the engine cabs, none gives indications for diverging routes. Should the apparatus fail, the engineman would be without any signal system until repairs were made, probably at the end of his run, unless the engine were immediately side-tracked as disabled and another substituted.

It follows, therefore, that, for safe operation, none of our present safeguards may be abandoned. We cannot save in the maintenance of track or structures, reduce our policing nor relax our vigilance in any degree. Our men must still be keyed up to watch their track and signals. We can effect no saving in cash or brains. The automatic stop must, if installed, be used solely as an adjunct to our present systems. The engine runner should be constantly alert and should watch his track for obstructions which cannot be anticipated by advance information. A [visual] cab signal constantly taking his attention from the outside observation is not only useless, but a positive detriment. The engineman is not an automaton and the installation of anything tending to lessen his feeling of responsibility would be most unwise, to put it mildly.

Cab signals should not be used either with or without automatic stops. In order to get the safest and best operating results the handling of the train must be left absolutely and entirely with the engineer as long as he properly controls it. He must know that it is so left to him, but that any lapse on his part will be checked and discipline imposed; that the automatic stop is not to do his work for him, but, like the smashboard and derail, is provided as an additional efficiency test. The safe handling of air brakes requires considerable skill; their frequent application by mechanical means not under control of the engineman would be very detrimental, causing discomfort to passengers and possibly serious freight wrecks. The automatic stop should be inoperative as long as the engineman properly functions. . . .

For the past six months the Pennsylvania Railroad reports show 99.74 per cent. efficiency in observing fixed signals at stop. The percentage of accidents resulting from the twenty-six-one-hundredths of one per cent. of failure to observe stop signals is not available. The disregard of a stop signal does not in itself result in accident; in most cases, no disaster follows. It is readily seen that such accidents constitute a small proportion of our totals.

On the Pennsylvania Railroad over \$4,500,000 has been appropriated for construction and maintenance of signals in 1913. Of this appropriation, nearly \$3,000,000 is for new work, which would be required even if automatic stops were installed, and similar sums will be required for a long term of years; though the road is more advanced than the majority.

P. J. Simmen has published a study of the causes of train accidents as reported by the Interstate Commerce Commission, in which he says that 64.8 per cent were preventable by a complete signal system, assuming of course that such system includes an automatic stop. What part of this percentage would the stop *per se* have prevented which would not have been avoided by the block system and other necessary signals, assuming, of course, that the stop was always effective? We can only guess! But one point stands out glaringly—that, in 4½ years, with all the signals in use in this great country, only 46 accidents are shown to have resulted from disregard of semaphore signals at stop

(and some of these may have been dwarf signals for slow movements), and one to "dead engineer," a total of 47 or 8.4 per cent., while the balance of the 64.8 per cent. or 56.4 per cent. would have been avoided by the installation of fixed signals *which are needed* under any conditions; less, of course, whatever percentage of these new signals might have been over-run. Were all these 46 signals which were over-run properly located? Were they provided with distant signals? We know some were not. If the fixed signal system were complete, would they have been over-run? We might speculate indefinitely. . . . Not over nine per cent. of the big accidents which attract so much attention *might* be prevented by automatic stops, but if the signal system were complete and efficiency tests were regularly and adequately carried on, 55 per cent. of these accidents would be eliminated without the use of automatic stops. In fact, taking the Pennsylvania Railroad record as a criterion, the figures would be nearer 60 per cent.; it being acknowledged that 35 per cent. are not preventable by any signal system. And it should be remembered that a stop will not prevent an accident caused by a train, after properly stopping or being automatically stopped, speeding up and passing the next signal at too great speed.

An automatic stop cannot be located at the distant signal or between the distant and the home, for, if an engineman has obeyed the distant signal and is approaching the home prepared to stop, he is doing his duty and should not be interfered with. It must, therefore, be located at the home signal, but must be so located that, if a train passes it at highest speed, it may be stopped before it has reached the danger point, preferably with a service application. The automatic stop therefore must be located at a stop signal at least 4,000 ft. from another stop signal placed at the danger point.

If a movement is to be made over a short crossover, the brake must, in ordinary operation, be applied 4,000 ft. away and again at the crossover and the stop released in each case. Long crossovers must be handled as now, or else stops, as indicated above, must be made whenever movements are to be made diverging from the main straight route. At railroad grade crossings one train must be braked 4,000 ft. away if another train is to cross; and the same is true at junctions. This would be particularly burdensome where they were scheduled to connect for the transfer of passengers. In manual block territory, additional power-operated signals would have to be provided at each interlocking and block station.

In automatic territory the present rule is "stop and proceed." To continue such operation, means must be provided to enable enginemen to release after the stop has operated or to make it ineffective after a train has stopped according to rule. This device must be inaccessible to the engineman until train has stopped, as, otherwise, it might be used wrongfully. In fact, it might be well to require the co-operation of two men to release the brakes. This inaccessibility will impose delay at each stop and proceed signal, particularly onerous in congested districts; in many cases requiring additional tracks to handle passenger traffic promptly.

In the case of freight trains, the chance of pulling apart if brakes are released while trains are running at slow speed after heavy application is recognized. A stop should, therefore, be made and as the train line opened by the stop could not be closed for an appreciable length of time, the air would probably be entirely exhausted, so that the time required to pump up 80 or 90 cars must also be considered. Furthermore, the application of the emergency brake to a slow moving train, especially freight,

\*From *The Signal Engineer*; abridged.

might produce a more serious accident than if the train were not stopped; endangering not only the train so stopped, but those on adjoining tracks. Separate freight lines might be the cheapest and most satisfactory remedy.

In certain districts—for example, between Summit avenue, Jersey City, and Manhattan Transfer—we were forced to devise means by which electric trains could be operated at short intervals and close together while providing sufficient advance warning to stop heavy steam trains. This is accomplished by displaying four indications, viz., (1) "proceed," (2) "pass next signal at medium speed," (3) "prepare to stop at next signal" and (4) "stop and proceed." By this method information is given for three blocks in advance, but trains may be operated only a block apart. The introduction of automatic stops with two "stop" and one "caution" signal back of each train would, in the rush hours, reduce the capacity of this line to one-third of the existing arrangement. This would mean four additional tracks across the Meadows. These additional signals and tracks will not help at grade crossings and junctions nor in terminals—in fact, will give relief only for straight-away following movements; indeed, the introduction of automatic stops would require an entire rearrangement of existing signals at a tremendous cost.

Automatic stops are impracticable in large terminals and at busy junctions and crossings. While they might be used in congested districts approaching such points, the cost of additional tracks and signals must be added to the cost of installing the apparatus on the ground and equipping all locomotives. . . . Money available could be more advantageously expended on visual signals and other safeguards which are still needed and which would prevent more accidents than would automatic stops. It is, of course, impracticable to equip each car with a stopping device—detached cars would not be affected by its operation. Apparatus must be so arranged that the leading engine on entering the block will not apply the brakes on the second engine of a double header or on a pusher engine; and so that switching movements will not be affected by it. . . .

Stops using electric contacting devices are not reliable, although they may have satisfactorily met certain demonstrative tests, and no stop having contacting devices of any kind is desirable. There remain a few other types which may be but are not yet fully developed to meet steam road conditions. . . . It may be said that some of the automatic stops have been tested with perfect success during winter months. But the exact conditions that will throw the whole system out of operation may not occur in several winters. The difficulty in keeping trains moving during winter storms is great enough without having them stopped by wholesale failures of an automatic device.

The installations in our tunnels at New York, on the Manhattan Subways, etc., are successful, but simply because the exceptional conditions existing at these particular locations make the problem an easy one.

An automatic stop located at the proper point for fast trains would require slow trains to stop at an unnecessary distance from the danger point. Unnecessary stops of heavy freight trains, or stops far short of the points where stops are really necessary, have a serious effect on the operation of a busy road. It takes time to start such trains and get them up to speed. The problem with which many railroad men are struggling is to keep the slow freight trains moving rather than to get them stopped.

With an engine switching at the point where an automatic stop is located to stop trains moving toward a danger point some distance away, the conditions may be such that the stop must be "set" to stop any train that may approach; at the same time the stop should not interfere with the switching movements which do not dangerously approach that point. The stop must stop a train that might be wrecked at an open switch and not stop the train that is to go on the siding at that same switch; must stop a train that might collide with another and not stop an engine that has to be coupled to a train.

If any safeguard other than the expansion of the fixed-signal system is decided to be necessary, and the money can be obtained,

an automatic stop *per se* should not be considered, but attempts should be made to develop a continuously controlled speed controller without contacting devices, if possible; so arranged as to leave the control of the train in the hands of the engineman until and unless he exceeds a safe speed. . . .

The sum and substance of the matter is that automatic stop devices must meet the test of approval by the judgment of practical railroad men, based on years of experience with actual railroad conditions and with appliances employing similar mechanism. . . . For the present any funds available should be devoted to the expansion and perfection of our existing block and interlocking systems, which must be provided in any event and which will eliminate the great majority of collisions; and then, if it is conclusively shown that improved discipline and pride on the part of locomotive engineers in their honorable profession such that they will, of their own accord, co-operate with the managements in their efforts to eliminate careless or incompetent men and make greater efforts to perform their duties more perfectly, all fail to produce the desired results, the general use of a speed controller should be required to check against the single kind of human failure, which is its only function.

Mr. Rudd by diagrams shows the extent to which the capacity of a railroad is decreased by introducing automatic stops and the necessary overlaps. With trains 500 ft. long, running straight away, under the automatic block system, at 60 miles an hour, and with signals spaced so as to give adequate braking distance (4,000 ft.) between the distant and the home signal, and allowing 500 ft. for the engineman to get a fair view of the distant signal the space between trains will be 9,730 ft. With automatic stops this will be increased to 13,730 ft. Running under caution signals at 20 miles an hour the space, under the present system is 4,705 ft.; with automatic stops it would be 8,705 ft. In these calculations the time allowed for a signal arm to move from one position to another is 7 seconds.

PROPOSED LINE FOR ARGENTINA.—Salvador Botey has applied to the government of the province of Santa Fe, Argentina, for a concession to build a railway from Rosario to Rufino.

RIVAL OF THE RAILROADS IN 1832.—The subject of steam carriages on common roads is already beginning to attract great attention in this country and we are afraid will operate not a little to the disadvantage of our enterprising neighbors at Baltimore who are so entirely engrossed with railroads. The directors of the Fredericksburg and Potomac Creek Railroad Company have determined for the present, in view of this matter, merely to graduate and level their road and have sent to England to obtain a steam car to use on it. If this succeeds, a new era will have arrived, and railroads will be superseded almost entirely. Success, we say, to improvements of all kinds.—*Extract from the Alexandria Gazette, published in the American Railroad Journal of August 4, 1832.*

PROPOSED RUSSIAN RAILWAY.—It is reported that the Committee for New Roads in St. Petersburg has decided to grant a concession for a railroad in the Caucasus from Borjom to Kars, with a branch line to Olti and a line to the village of Balkaya, and that its construction is practically assured. Since the plan has been approved by this committee it is said there will probably be no difficulty in obtaining approval of the other government departments, especially as the plan is favored by the high officials of the region in which the railway will be built, and by the ministry of war, the ministry of ways and communications, the ministry of finance and the ministry of commerce and industry. The majority of the members of the Imperial Duma are usually in favor of having the railways constructed by the government rather than by private enterprise, but since the Borjom-Kars railway will be built entirely by private capital (with a guarantee of the government for its revenue), the question of finances for its construction will not have to be submitted to the legislative departments.



# GRAND TRUNK GRADE SEPARATION IN TORONTO.

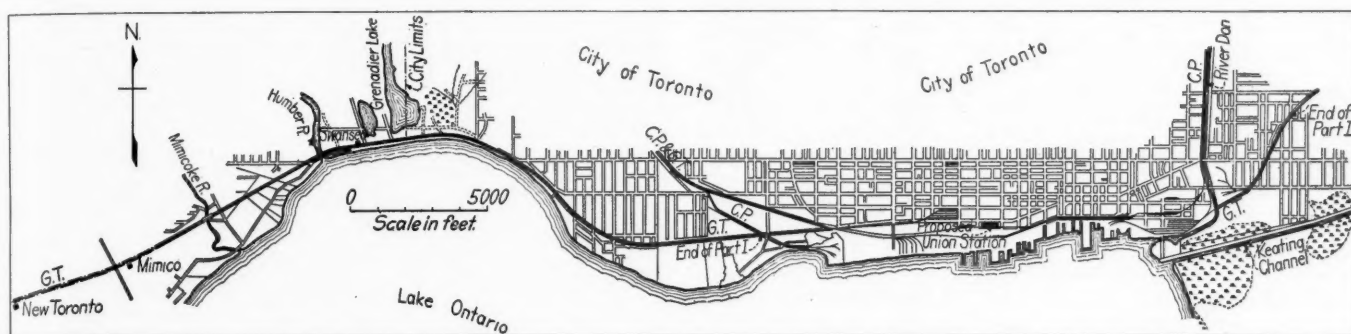
Highway Grade Crossings Are Being Eliminated and Plans Made for New Terminals Including Union Passenger Station.

Three lines of the Grand Trunk enter Toronto, Ont., from the west, converging west of the central portion of the city and running along the water front to the union station and terminal yards located within a few blocks of the business and administrative center of the city. This station is also used by some of the trains of the Canadian Pacific and the Canadian Northern.

In planning with the city and Board of Railway Commissioners for the elimination of grade crossings in the city, the Grand Trunk divided its lines into three sections: the first, west of the Canadian Pacific crossing near Strachan avenue; the second, between this crossing and a point just east of the River Don near Logan avenue; and the third, extending from this point east. The work undertaken in the first section (Part I) is now

carry all tracks over Berkeley and Parliament streets at the junction of the Grand Trunk and the Canadian Pacific on the east station approach.

East of Church street there are so many industries located close to the south side of the elevated line, which are now reached by individual grade crossings, that a new street will have to be laid out paralleling the tracks, on which these plants can face, and surface tracks will be laid along this street to be operated by the Canadian Pacific. A similar arrangement will be made for the plants north of the elevated line, the tracks on this side to be operated by the Grand Trunk. The board has ordered that no trains be operated over these surface tracks between Church and Parliament streets during May to September inclusive, ex-



Map of Portion of the City of Toronto Showing Grand Trunk Lines on Which Grade Crossings Are Being Eliminated.

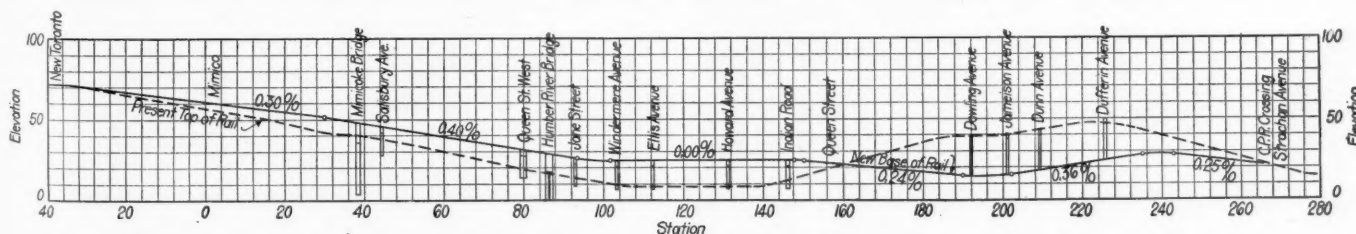
practically completed. This has involved only the Hamilton line, which skirts the lake front.

## UNION STATION AND TERMINAL SECTION.

The Railway Commission has approved the plans for work to be done in the second section. This includes the building of a new union station and the rearrangement of the terminals of the Grand Trunk and the Canadian Pacific. The elimination of grade crossings through this central district, which is occupied by numerous tracks and lined with docks and warehouses along the lake, was a difficult problem, as the company disliked to elevate all its tracks to allow streets to pass under them, and the city objected to having the streets raised on overhead bridges.

cept between 10 p. m. and 6 a. m. unless the merchandise carried is perishable, in which case a flagman must precede the train on foot. This arrangement is claimed by the railway companies not only to be dangerous to the public, as switching movements will be carried on at the mouth of all subways, but that the industries will be seriously hampered while the work is in progress, and, therefore, have submitted an alternative plan to the commission, showing a new location for the elevated tracks farther south, thus allowing all construction work to be completed before any alteration is made to the present facilities. All of these questions will be decided shortly by the Railway Board.

The station building will be located between York and Bay streets, facing Front street, just east of the present building. In



Profile of the Portion of the Grand Trunk Affected by the Toronto Improvement.

Three streets west of the present station are now carried over the tracks, and for these and several others this seems to be the logical method, for the street paralleling the tracks with which these cross streets connect is at a considerably higher elevation than the tracks and approaches to the viaducts from that side can be made quite easily. The section south of the tracks, however, is low and flat and it is difficult to obtain a satisfactory grade to such viaducts from the south side.

The plan as approved calls for the elevation of all through tracks and some yard tracks with overhead street crossings at Bathurst, Spadina and John streets, subways at all streets between York and Princess, and a steel viaduct 600 ft. long to

a report prepared by the Civic Improvement Commission and presented to the city in 1911, by John M. Lyle, consulting architect, this station location is harmonized very nicely with the proposed plan for city improvement. In this report an administrative square is recommended to be located between University and Yonge and Agnes and Queen streets, which would be connected with the station by a broad avenue to be constructed between York and Bay streets. The city has as yet taken no active steps toward carrying out this plan, however. The station will be of the through type with ten tracks. A Bush train shed will be supported on columns set in the center of 18 ft. passenger platforms, and covering, in addition to the adjacent tracks, 12 ft.

baggage and express platforms which are provided between each pair of tracks. The passenger platforms will be reached by stairs from a transverse subway below the track level and baggage, mail and express being delivered to the narrow platforms by elevators from separate subways for each class of service. This separation of the passengers from the other business of the station should eliminate all confusion in the train shed. The passenger subway is entered from a concourse 80 ft. wide along the train shed which slopes down from the waiting room level

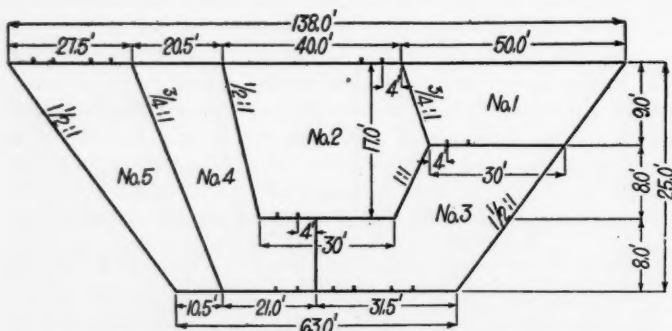
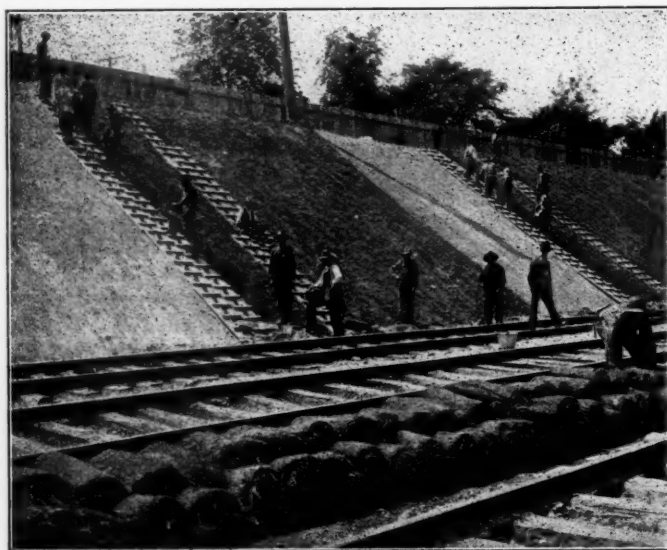


Diagram Showing Sequence of Shovel Cuttings.

on a 4.1 per cent. grade. The concourse will have exits at both ends in addition to the connection with the main waiting room alongside, although the complete details of the building have not yet been decided upon. The Canadian Pacific now expects to build a union station with the Canadian Northern in North Toronto, which will take many of its trains out of the present union station. Until a final decision as to this matter is reached, the building and yard plans are subject to some changes.

#### GRADE SEPARATION IN PART I.

The work on the section west of the Canadian Pacific crossing was begun in August, 1910, but was seriously delayed that fall

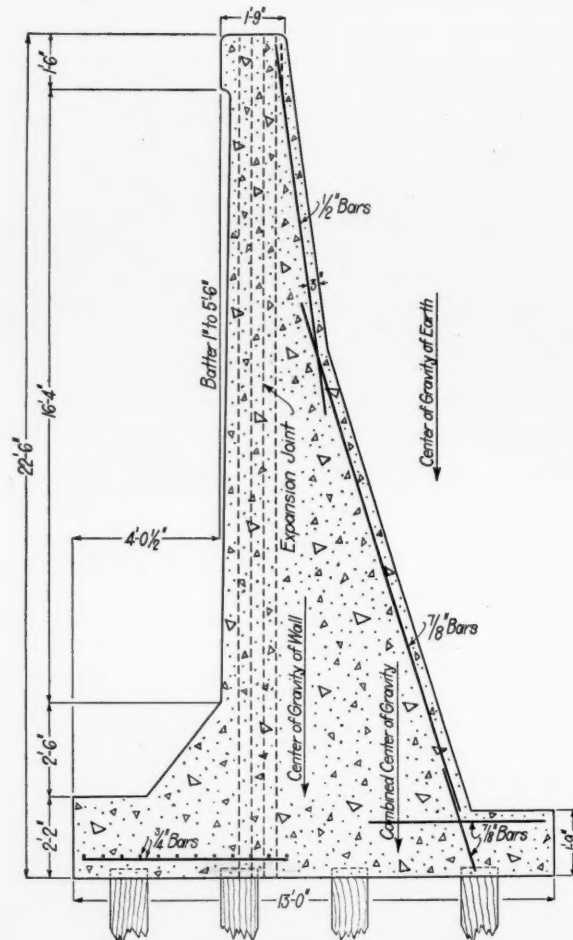


Laying Sod on New Slope in a Cut.

by the trainmen's strike. Most of the grading was done during the summer of 1911, and the foundations for some of the subways and overhead bridges were placed. This work was resumed in the spring of 1912, and was practically completed during the summer. This work has cost about \$2,000,000, of which the city paid one-third of the cost of a two-track construction, although four tracks have been laid. The excavation for foundations amounted to 75,000 cu. yds.; the grading totaled 800,000 cu. yds.; 67,000 cu. yds. of concrete and 3,100 tons of steel were placed; 7,000 sq. yds. of macadam, 7,000 sq. yds. of stone block and 4,000 sq. yds. of granolithic pavement have been laid; 10 miles of new track

have been installed and 4 miles of old tracks altered; 100,000 sq. yds. of sod were required for the slopes of the new cuts.

In addition to the regular freight and passenger business which the Grand Trunk handles between Toronto and Hamilton, this piece of track carries the Toronto-Buffalo traffic of the Canadian Pacific and all freight movements into and out of Mimico yard, where the Grand Trunk handles all its classification for the Toronto district. The old double track line between Toronto station and Mimico had from 275 to 300 movements daily, which made it badly congested at times. In planning the grade separation in this district, therefore, it was thought best to make this line four track, thereby increasing its capacity to handle business and considerably simplifying the problem of making cuts as deep as 25 ft. and fills as high as 16 ft. without interrupting traffic. The two outside tracks of the new four track line will be operated for freight traffic and the inner two for passenger service.



Typical Section of Retaining Wall.

The roadbed will be brought up to the highest standard of track construction used on the system, 100 lb. rail, hardwood ties and rock ballast being used.

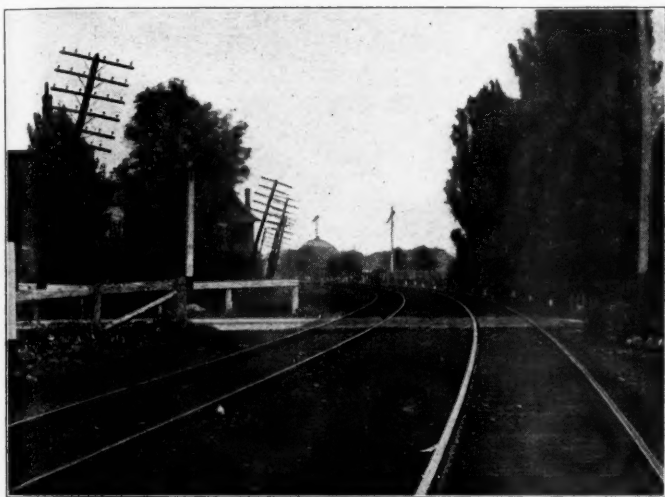
The accompanying profile shows the change in grade which has been made. The old line had a hump near the east end of the section and a sag west of this hump, with maximum grades of 0.7 per cent. By cutting down the hump and filling the sag, it was possible to secure a grade line having a maximum 0.4 per cent. grade and at the same time secure a balance between cut and fill which would eliminate the necessity for extensive borrow or waste. The latter feature was really the more important consideration, for the reduction in grade on these six miles of line does not allow any change in rating over the operating district and the same rise has to be overcome. Leaving the Canadian Pacific crossing, the new grade rises on a 0.25 per cent. grade for a short distance, then falls on a 0.36 per cent. grade under Dufferin, Dunn, Jameson and Dowling avenues.



From the latter street, the grade is rising again, intersecting the old grade near Queen street, which is carried over the tracks on an overhead bridge with long approaches. West of this point, the new grade is level over Indian road, Howard, Ellis and Windermere avenues, and then rises on a 0.4 per cent. grade crossing Jane street, the Humber river, Queen street West, Salisbury avenue, Mimicoke creek and Church street. In all there are five overhead street crossings, eight subways and two waterway crossings.

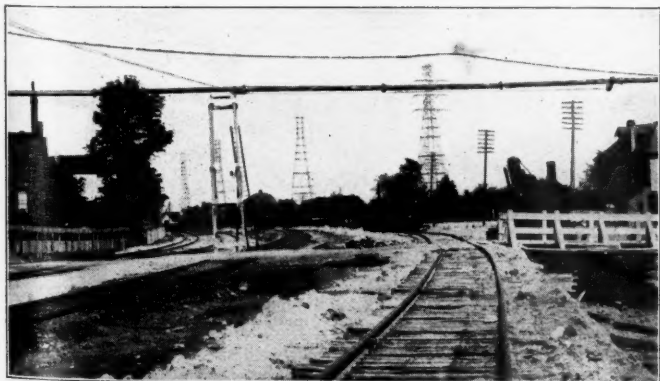
#### EARTHWORK.

The excavation consisting mostly of blue clay and some rock on the eastern half of Part 1 was handled by three steam shovel outfits using 90 ton Marion shovels and standard gage Haskell



Looking East at Dunn Street Before Excavation Was Begun.

& Barker cars with a Lidgerwood unloader. One side of the cars was taken out and a side plow used in order to facilitate the handling of the hard and coarse material. The cut was taken out in three benches, always keeping two running tracks open for traffic. The fact that as much additional right of way would have been needed to carry the running tracks during the construction of a double track line on the new grade as has been used in making it a four track line was a strong argument in favor of the plan adopted. The additional right of way was acquired on the south of the old tracks. The accompanying



Looking East at Dunn Street While the First Shovel Cut Was Being Made.

cross section which was furnished to the shovel supervisor, and the three progress views of Dunn avenue show the method used in the excavation. The first of these views was taken before the work was started. In the second, the running tracks have been shifted to the extreme northern edge of the right of way, and a steam shovel is finishing the first cut along the south right of way line. The next cut was made under the track which is

seen in the center of the view, the material being loaded into trains operated in the cut on the right. Then by cut No. 3 shown in the cross section, the elevation of final subgrade was reached and the two running tracks were thrown down on this level. The remainder of the southern half of the cut marked 4 and 5 in the cross section was then removed, there being always room



Looking East at Dunn Street After the Third Shovel Cut.

for a loading track alongside the shovel without interfering with traffic on the low level. In the last view, the two tracks on the right are on final subgrade, and there remain two shovel cuts on the left to be removed.

The standard cut slope is  $1\frac{1}{2}$ : 1, back filled, if necessary, to get a true slope. All cuts are sodded, thus materially improving the appearance of the right of way and preventing the slope from washing and filling up the ditches. The sod was bought by contract at eight cents a square yard, f. o. b. cars. It was



Dufferin Street Overhead Bridge at Entrance to Exhibition Grounds.

hauled about 35 miles and laid by company forces at a total cost of 22.71 cents a square yard, apportioned as follows:

Sod .....	8.00c. per yd.	Pegging .....	.79c. per yd.
Freight .....	5.00c. per yd.	Trimming slope....	1.34c. per yd.
Train service....	3.70c. per yd.	Incidentals .....	.21c. per yd.
Unloading .....	.39c. per yd.	Foreman .....	.41c. per yd.
Carrying .....	2.08c. per yd.		
Laying .....	.79c. per yd.	Total .....	22.71c. per yd.

As it was impossible to secure additional right of way along the Industrial Exhibition Grounds, which are adjacent to the line just west of the Canadian Pacific crossing, it was necessary to build a retaining wall along the south side of the cut at this point. The section of the wall built is shown in an accompanying

drawing. Reinforcement is provided in this wall for the footing and the inside face.

#### OVERHEAD BRIDGES.

As excavation proceeded under the streets, temporary frame structures, cribbing or framed bents were erected to carry the street traffic. In several cases it was necessary to carry gas mains over the cut during construction work. At Dunn avenue, vertical sections of the pipe were inserted at each side of the right of way and the horizontal section over the cut was supported by a cable anchored to posts at each side. In the finished construction these mains were buried in the floor of the overhead bridge.

The concrete abutments for the overhead bridges were placed

An ornamental lattice fence is provided outside of each sidewalk. The floor system is encased in concrete which continues above the stringers at the center line of the street, thus draining water to special waterproofed channels along the main girders. The spans vary from 66 ft. to 100 ft. and are carried on concrete abutments, all of which are 60 ft. face to face.

The waterproofing is by the membrane method, applied as follows: The smooth surface of the concrete was treated with a coat of concrete primer applied cold. A few minutes later when the primer had set, the hot waterproofing was mopped on and three ply of 8 oz. burlap was immediately laid, each ply being mopped with the waterproofing and well brushed to, force the hot liquid up through the fabric. The burlap was well flashed up on the main girders to a height equal to the crown of the

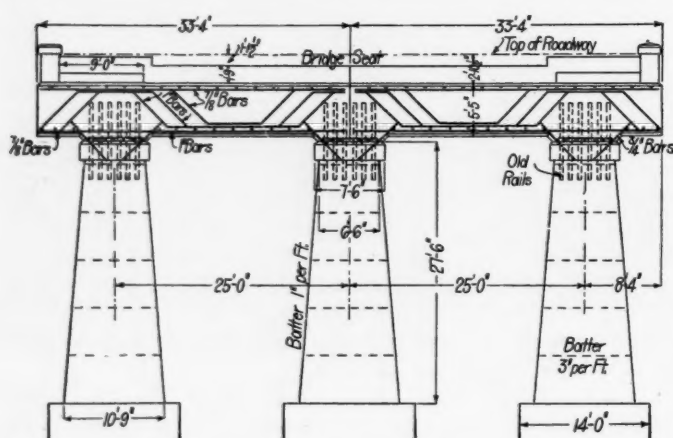


Panorama of Sunnyside Crossing Showing Abutment and Footings for Steel Trestle Approach.

by a mixer outfit mounted on cars requiring only one track for its operation. The mixer car was equipped with a tower which could be dropped down to allow the car to be moved under structures and this mixer car was coupled to a hopper car and a series of material cars. The aggregate was wheeled from the material cars to a specially designed measuring box in the hopper car just back of the mixer, where the proportion of the aggregate was determined and the mixed sand and stone dropped into a small car which was pulled up an inclined track over the mixer car to a point from which the materials could be dropped into the mixer. The mixer discharged directly into the elevator bucket, from which the concrete was dropped to place through wooden chutes. About 30 men were used with this plant, 10 loading wheelbarrows on the material cars, 10 wheeling and 10 operating the mixer and placing the concrete. This force is exclusive of the carpenter gang employed on forms. One abutment

finished road. The sidewalks were waterproofed in the same manner, except that only two ply of burlap was laid. The whole bridge was then swabbed with waterproofing to seal all joints and laps of the fabric. While this final application of waterproofing was being made and was still hot, one layer of asbestos felt was laid with joints lapped 3 in. and sealed with the waterproofing.

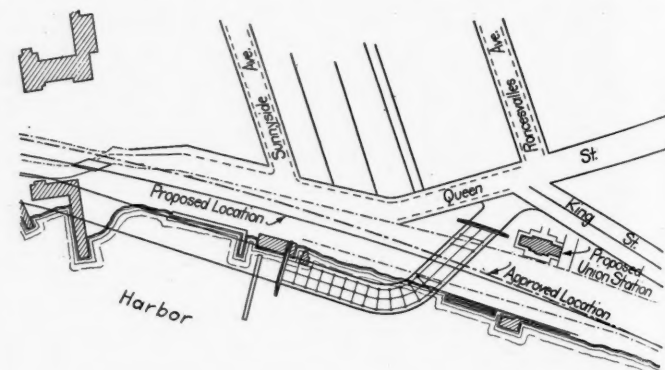
A protection of  $\frac{3}{4}$  in. of mastic was laid over the water-



Elevation of Abutment for Sunnyside Overhead Highway Crossing.

containing about 900 cu. yds. was placed in 10 working days by this plant. The concrete used in abutments was a 1:  $2\frac{1}{2}$ : 5 mixture.

The standard overhead highway bridges are of the through plate girder type. The floor beams which carry I-beam stringers are suspended from the girder webs continued through the bottom flanges at connection points. Two six ft. sidewalks are supported outside the girders on brackets from the floor beams.



Plan of Sunnyside Crossing Showing Location of New Viaduct and Station.

proofing in convenient widths and all joints sealed by ironing. The finished surface of the sidewalks is of the same material, but is of a richer mixture applied  $\frac{3}{4}$  in. thick. The finished surface of the road is a 4 in. creosoted block pavement laid on a 2 in. sand cushion. To reduce the floor depth to a minimum in order to obtain an easy road grade at one bridge, the mastic protection was laid on the roadway in two layers each of  $1\frac{1}{4}$  in. with lapped joints and used both as a protection to the waterproofing and a wearing surface for the roadway, thus saving the 6 in. taken up by sand and blocks. Two different waterproofing materials were used, one supplied by the Standard Asphalt & Rubber Company, the other by the Johns-Manville Company, the general specifications for each being practically the same.

#### SPECIAL STRUCTURES.

The Queen street grade crossing has been known as one of the most dangerous in Canada. Not unfrequently 40,000 pedestrians and 2,500 vehicles pass over this point within 24 hours. Vehicles approaching from the north were not in sight from the



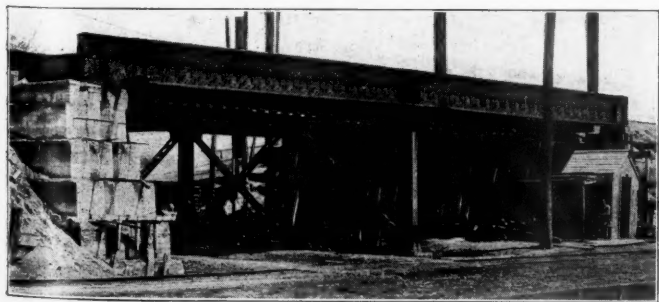
track, as the road was at a considerably higher elevation than the railway and approached the crossing on a steep grade. The new crossing is a short distance east of the old one at a point where the north bank is high enough to allow the bridge to spring from an abutment on that side almost at present ground level. On the south side a steel viaduct will carry the road from the bridge around a sharp curve to an abutment, from which a descent to the present level will be made on an earth fill having a grade of 2.17 per cent. One of the photographs shows the



Looking East from Jane Street, Showing the Elevated Section.

abutment at the end of the steel viaduct and the pedestals for the columns of this viaduct. The lake will be filled to a line outside these pedestals, using the material taken from the point of the cut between the lake and the tracks just east of the Queen street crossing. The decision to carry this street up to an overhead bridge was reached after the grade line was fixed so that the cut and fill do not balance by the amount needed in the earth embankment for the roadway approach. A portion of this, however, can be secured by widening the cut at the point next to the lake, as mentioned above.

The viaduct section of the Queen street bridge consists of 17 spans. The I-beam stringers are carried on floor beams supported directly on the steel bents. The first eight spans from the crossing are of irregular lengths varying between 22 and 23 ft. The next six spans are 25 ft. 6 in. long, and the last three are respectively 25 ft. 6 in., 27 ft. and 28 ft. The maximum height of columns is at the third bent from the crossing where the distance from the top of piers to the top of roadway at the center line of the bridge is 35.97 ft. Transverse bracing is provided to connect adjacent bents to form towers. The crossing over the four tracks is skewed 30 deg. and is made by two plate girder spans, the longer girders being 92 ft. 4½ in. center to



Two-Span Subway at Keele Street.

center of bearings and the shorter ones 61 ft. 3½ in. On account of the length of these spans, three girders are used, one being on the center line of the bridge. A double track street railway is carried over this bridge, the tracks being spaced 10 ft. 2½ in. center to center. The roadway is 60 ft. wide and a 9 ft. sidewalk is carried along both sides on brackets from the floor beams. The street railway rails are carried on short sections of wooden ties under each rail, the ties resting directly on the I-beam stringers. The concrete casing, waterproofing and pavement are the same as used on the standard highway bridges.

The abutment at the end of the viaduct is of a special design, shown in one of the accompanying drawings. There are three columns 10 ft. 9 in. by 19 ft. at the bottom and 6 ft. 6 in. by 6 ft. 4.5 in. at the top, carried on footings 14 ft. by 24 ft. which support a transverse beam of reinforced concrete 66 ft. 8 in. long, 6 ft. 2 in. deep and 6 ft. thick, the bridge seat being 27.68 ft. above the top of footings. The back wall is carried up 1 ft. 9 in. above the bridge seat. The columns are battered 3 in. per foot on the front face and are stepped in 1 ft. 3 in. at intervals of 5 ft. on the back face, the sides being battered 1 in. per foot. The tops of these columns are bonded to the cross beam by old rails 8 ft. long, spaced 1 ft. center to center and extending into the top of the columns for half their length. There is no other reinforcement in the columns. In addition to the bond, the cross beam is reinforced with 1 in. bars in the lower plane of reinforcement which are bent up to resist shearing stresses and ¾ in. bars in the upper plane of reinforcement.

As a suburban station is maintained at the Queen street crossing, a new station design was arranged to harmonize with the proposed highway bridge. This building is on the original ground level above the tracks near the intersection of King and Queen streets and is connected with the track level by a foot bridge spanning the first two tracks and connecting with a stairway which leans down to a passenger platform 450 ft. long between the two middle tracks. There is also a baggage elevator in one



Four-Span Subway Carrying Omen Street West Under the Grand Trunk.

end of the station which connects with a baggage-way at track level. Driveways are provided to connect the station with the streets so that carriages can approach without difficulty. The building itself is of stone and brick of a type not uncommon for such structures.

The Humber river is crossed on a four track deck girder structure of two 100 ft. spans designed for Cooper's E50 loading. The old bridge was a double track, single span, through truss on masonry abutments. A slight change in line was made to permit the construction of most of the new bridge south of the old one. The new concrete pier and all of the two abutments, except the north wing walls, were built and the south half of the new bridge was erected without disturbing the old bridge. Traffic was turned over the new bridge, the old bridge was dismantled and the wing walls of the new abutments were then completed over the old masonry. The north half of the new bridge was then erected.

Although all the foundations were made by driving 60 ft. piles to refusal through clay and sand strata, a peculiar settlement of the east abutment occurred after the new bridge was in service. The first sign of settlement was a crack which developed at the junction with the old masonry. Shortly after, a distinct settlement of the back end of the abutment could be seen. It is a well-known fact that in the vicinity of Toronto are found some of the finest examples of the glacial period in existence, each

recession being indicated by alternate strata of clay, sand and sometimes peat. It was found upon examination that a 10 ft. layer of peat, 35 ft. below the surface, must be flowing or compressing, thus allowing a gradual settlement. It was decided to drive a number of rows of piles around the south edge of the foundation in order to compact the supporting strata and stop the trouble. This apparently served its purpose, for the settlement ceased until a continued rainy spell came, when the back end began to sink again. A further examination indicated that the piles driven around the site were sinking at the same rate as the abutment, but it was noticed that the movement was gradually decreasing and it has now entirely ceased after a maximum settlement of 3 ft.

The other stream crossing is over Mimicoke creek near the western limits of the work. A single span double track deck truss bridge was replaced by a four track deck plate girder structure, the girders being erected outside the trusses in such a way as to keep the bridge open for traffic.

#### EMBANKMENT AND SUBWAYS.

West of the Queen street crossing (Sunnyside) there is a continuous fill to Mimico, the western end of the work. The traffic was first diverted to two temporary tracks along the north right of way line laid on an embankment which had been raised to the height of the old track grade. One track in the unused portion of the right of way was then raised on a trestle to the height of the new grade. This trestle was filled and the banks were widened from this fill. When the embankment was wide enough to permit it, two running tracks were diverted to their final position on the higher elevation and the remaining fill necessary to make the embankment of four track width was completed. This fill was allowed to take its natural slope, except at one point, where adjoining buildings made it necessary to put in a short length of retaining wall on the north side.

The standard subway used on this work consists of half through girders between tracks with 20 in. 65 lb. I-beams set transversely and carried from the girders by means of web connections. These I-beams and supporting girders are encased in concrete of a 1 : 2 1/2 : 5 mixture to protect the steel and carry the ballasted track. This concrete is waterproofed in the same manner as the highway bridges described above. The mastic is applied in two 5/8 in. layers and is carried up to flashing angles on the main girders. The joints in the mastic are arranged to drain the water to the ends of the bridge. A 2 in. cement mortar coat is provided over the waterproofing upon which the ballast is laid. The street width face to face of abutments is 60 ft., a single support on the center line of the street being provided. These supports consist of steel bents on concrete pedestals.

The first plans for separating grades in Toronto were made and work on Section 1 was started under the direction of Howard G. Kelley, vice president, formerly chief engineer, and this work was completed under the direction of H. R. Safford, chief engineer. J. R. W. Ambrose was engineer of grade separation in direct charge of the work in the field. G. A. Mitchell, supervisor of bridges and buildings at Toronto, handled the construction of the bridges, and D. McCoee, superintendent of grade separation, directed the company forces handling the grading. The Canadian Bridge Company and the Canada Foundry Company fabricated the steel work.

**NEW RAILROADS IN SICILY.**—The Italian government has recently definitely ordered the construction of two further sections of the complementary narrow-gage railroads provided for by the royal decree of July 12, 1906. One six-mile section to run from San Carlo to Caltabellotta via Burgio, in the province of Girgenti, will cost \$225,000. The other eight-mile section to connect the town of Gibellina, province of Trapani, with Belice, province of Girgenti, will cost \$478,640. It is understood that tenders are being filed with the Direzione Generale delle Ferrovie dello Stato at Rome.—*Consular Report.*

## TRAIN ACCIDENTS IN APRIL.<sup>1</sup>

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of April, 1913:

Collisions.					
Date.	Road.	Place.	Kind of Accident.	Kind of Train.	Kil'd. Inj'd.
*2.	Lehigh Valley .....	Buffalo.	rc.	F. & F.	0 4
25.	Louisville & Nash....	Corbandale.	bc.	P. & P.	1 10
26.	Illinois Central .....	Duquoin.	rc.	P. & F.	0 2
27.	Chi. St. P. M. & O....	Baldwin.	bc.	P. & F.	2 5
28.	N. Y. N. H. & H....	Quincy.	bc.	P. & F.	0 12

Derailments.					
Date.	Road.	Place.	Cause of Derailm't.	Kind of Train.	Kil'd. Inj'd.
7.	Wabash .....	Wolcottville.	b. rail.	P.	1 1
8.	Wabash .....	Kinloch.	b. rail.	P.	0 20
10.	Union Pacific .....	Ascalon, Col.	snow.	P.	1 7
20.	C. C. C. & St. L....	Evansville.	exc. speed.	F.	1 5
22.	Baltimore & Ohio....	Ravenna.	unx.	P.	0 4
27.	Rutland .....	Beldens.	unx.	P.	.. 8

The trains in collision near Buffalo, N. Y., on the 2nd were westbound freights. A long freight train drawn by two engines running at good speed ran into the rear of a preceding coal train. Four trainmen were slightly injured. The wreck took fire from one of the engines and 12 cars were burned up. The cause of the collision was improper flagging and excessive speed. The collision occurred on a freight line where trains are required to run under control.

The trains in collision near Corbandale, Tenn., on the morning of the 25th, were northbound passenger No. 104 and southbound passenger No. 101. A mail clerk was killed and 7 trainmen and 3 passengers were slightly injured.

In the collision near Duquoin, Ill., on the 26th, a passenger train ran into the rear of a preceding freight, wrecking the caboose. The engineman and fireman of the passenger train were slightly injured by jumping off.

The trains in collision at Baldwin, Wis., on the night of the 27th, were eastbound passenger No. 2 and a westbound extra freight. Both engines were wrecked and three cars of the passenger train and five of the freight were badly damaged. The engineman and the baggageman of the passenger train were killed and five passengers were injured, none seriously. The collision was reported as due to misunderstanding of orders on the part of the freight.

The trains in collision near Quincy, Mass., on the 28th were a southbound passenger and a northbound work train. Both engines were badly damaged. The passenger train was heavily loaded and the work train carried sixty laborers. Ten of the laborers and two passengers were injured.

The train derailed near Wolcottville, Ind., at 3 o'clock on the morning of the 7th was westbound passenger No. 7, and the engine and baggage car were overturned. The engine lodged in 7 ft. of water. The engineman was killed, and the baggageman injured. All of the passengers escaped with slight injuries. The cause of the derailment was a broken rail.

The train derailed near Kinloch, Mo., on the night of the 8th was eastbound passenger No. 2, and three passenger cars were overturned and ditched. Seventeen passengers and three other persons were slightly injured.

The train derailed near Ascalon, Colo., on the night of the 10th was eastbound passenger No. 110, drawn by two engines. It was derailed in a snow drift in a cut, and the leading engine was overturned. The engineman of the second train was killed, and 3 trainmen, 3 mail clerks and one passenger were slightly injured. The snow drift was about 2 ft. deep, and the pilot

<sup>1</sup>Abbreviations and marks used in Accident List:

rc, Rear collision—bc, Butting collision—xc, Other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—unx, Unexplained—derail, Open derailing switch—ms, Misplaced switch—acc, obstr., Accidental obstruction—malice, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P. or Pass., Passenger train—F. or Ft., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.



of the engine was bent down so as to derail the front truck.

The train derailed near Evansville, Ind., on the 20th, consisted of an engine, one passenger car and a caboose, the engine running backward. While moving at about 20 miles an hour the train went off the track and the cars fell down a bank. The man running the engine was killed and several other employees were injured. The cause was excessive speed and defective track, damaged by flood. The conductor and engineman had absented themselves and the fireman was in charge. He was killed.

The train derailed near Ravenna, Ohio, on the 22nd was west-bound passenger No. 11. Two sleeping cars were overturned, and four passengers were injured.

The train derailed near Beldens, Vt., on the 27th was north-bound passenger No. 65. The tender and five cars were ditched. Eight passengers were slightly injured. The cause of the derailment was not determined.

*Canada.*—The derailment of a passenger train on the Central Vermont near St. Lambert, Quebec, April 13, was reported in the *Railway Age Gazette* of April 18. Six passengers and one employee were killed and 30 passengers and two employees were injured. The cause of the derailment is said to have been excessive speed, 35 to 40 miles an hour, when the engine was running backward.

## PROPER AIMS IN TRAINING FOR RAILWAY SERVICE.\*

By H. G. HETZLER,

President, Chicago & Western Indiana.

In deciding upon the kind of service that one will devote attention to, the aim should be, if possible, to select that which will be congenial, and for which the individual is seemingly best qualified, as it would be a mistake to choose for a life's business a work that is distasteful and into which it would be hard to throw one's best thought and energy. There is really no easy road to what is termed "success." Advancing in railroad service is no exception to this rule. The work is exacting and sometimes discouraging, but I want to assure you that the field is a splendid one.

During the past few years the civil engineers have been busy studying methods and schemes to increase the efficiency of the railroads and at the same time reduce the cost of operation. Improvement has been made in many cases where lines have been relocated so as to reduce the grades and improve the alignment; terminals have been changed and enlarged so as to facilitate the movement of traffic through them. The mechanical engineer has been just as active, and splendid development has been wrought in motive power and car equipment. The electrical and signal engineers, by their endeavors, have not only aided in efficiency, but have also to a marked degree increased the safety of operation. Nevertheless, the opportunities for the future engineer in the service are unbounded.

The development of our country will demand, in order to meet its requirements, the addition of thousands of miles of track, together with the equipment and facilities necessary to operate them. Laws and regulations have been and constantly are being imposed by state and nation upon railroads, which give rise to many new conditions.

The increase in population, with the consequent increase in the value of property, which are the conditions in our growing cities, add their share to the difficulties encountered. These and many other conditions indicate that the engineer of the future should aim not only to be familiar with strictly engineering problems, but also to keep in touch with the desires of the public and endeavor to comply with them, and at the same time obtain the best results from a railroad viewpoint.

The railroad service is made up of various departments, each differing from the other in its requirements. They are, however,

so thoroughly dependent, one upon another, that if for any reason one department does not come to the required standard the entire service is affected more or less by this weakness. Therefore, one should, in addition to being familiar with his own department, understand in a general way the requirements of the other departments, in order to thoroughly co-operate with and bring about the best results, not only for the railroad but for one's self. I can best illustrate this by a personal experience.

Some years ago I was employed in the maintenance of way department of a railroad when a vacancy occurred in another branch of the service which would have been a promotion for me if I had obtained the appointment. The superintendent, thinking that I might feel disappointed on account of not receiving the promotion, called me to his office and said he would have liked very much to give me the position but because I apparently had not been thinking of any department but my own, he did not believe I was in shape to be transferred to the other department. This certainly was a new viewpoint for me, and I immediately commenced to study not only my own work, but at the same time to become familiar with the work of the other departments, and I assure you that although I was disappointed at the time, the disappointment proved to be a benefit.

On entering the service of a railroad, one becomes a part of a large force of employees working in various occupations. It should be the aim to keep in such a frame of mind and thought as to enable one to work hand in hand with brother employees for the improvement of the service. One cannot advance materially in the service without becoming a leader of men, and to become a leader, one must not fail to co-operate with and hold the esteem of one's fellow workers.

A railroad being a public service institution, its prosperity (just as in the case of an individual or business concern) depends to a large extent upon its standing in the community served. Therefore the aim should be to serve the public in such a manner if possible as to warrant its approval.

It is difficult to point out the particular aims that apply more especially to railroad service than to other work, but I will feel that I have partially succeeded if you carry in mind those I have mentioned, which can be summarized as follows:

Endeavor in entering the service to choose the department that will be congenial and for which one feels best qualified.

Keep in touch with the demands of the public.

Master the details of your chosen department and become familiar with the requirements of the other departments.

Co-operate with your fellow workmen and the public.

**NEW LINE FOR FRENCH EQUATORIAL AFRICA.**—A line 360 miles long will soon be built from Pointe Noire on the Atlantic coast, just south of Loango, French Equatorial Africa, to Brazzaville, on Stanley Pool. This year the government proposed to vote \$17,000,000 for the construction of this line and the betterment of the ports at either terminus. It will take some eight years to build.—*Mining and Scientific Press.*

**HAICHOW-LANCHOW RAILWAY, CHINA.**—Two detachments of engineers are now locating the Haichow-Lanchow Railway. For the present the line is to be built only to Lanchow, but a further extension is contemplated to Suchow in Kansu. This is one of the most important railway projects which China has ever undertaken. It will open up a vast territory through the greater part of which there are no navigable waterways. This statement applies particularly to the provinces of Shensi and Kansu, foreign imports into which, and the exports therefrom must be carried on the backs of animals or of men over difficult mountain paths at great expense and with much loss of time. The projected line will cross two other provinces—Honan and northern Kiangsu, the first of which is served in some degree by the Peking-Hankow and the Kai-feng-fu-Honan-fu railways, and the second by the Grand Canal and the Tientsin-Pukow Railway.

\*Abstract of an address at the Railway Conference at the University of Illinois, Urbana, Ill., on May 9, 1913.

# COMBUSTION IN LOCOMOTIVE PRACTICE.

Not Thoroughly Understood and Presents Wonderful Possibilities from the Standpoint of Increasing Boiler Efficiency.

By J. T. ANTHONY.

American railroads use about 135 million tons of coal annually, at a cost of some 240 million dollars, or 12 per cent. of their total operating expense. Managers and motive power officers, the country over, are well aware of the fact that a large part of this coal is wasted through imperfect combustion, and their efforts to locate the cause and apply a remedy have, in many cases, resulted in the fireman's exaltation to the position of "chief goat." Too often has he been held responsible for a condition of affairs for which he was little or in no wise to blame.

Volumes have been written about methods of firing; about "bright, light and level fires"; about "cross firing"; about "single scoop firing"—all of them good methods and useful, maybe, when it is possible to follow them, but none of them sufficient to approximate perfect combustion in the firebox of a modern locomotive. During recent years the public has been waging an earnest fight against the smoke nuisance, and the railroads have been forced to give the matter serious attention, but most of the attention has been directed to the firemen in the form of

to approximate perfect combustion in the firebox of our modern, high-powered locomotive, with ordinary firing, it is essential that the following provisions be made:

First, a secondary air supply above the fire.

Second, an intimate mixture of the volatile matter and the air.

Third, flame-way or combustion chamber space sufficient to allow all gases to be completely burned before reaching the back flue sheet.

In an ordinary locomotive firebox all the air is supplied through the grate. As this air comes in contact with the glowing coals of carbon at the bottom of the fuel bed, it gives up its oxygen, two parts of which readily unite with one part of carbon to form carbon dioxide. The carbon dioxide thus formed passes on up through the fuel bed and unless accompanied by an excess of air, on coming in contact with the glowing carbon it gives up part of its oxygen and is reduced to carbon monoxide. When the carbon monoxide thus formed is brought in contact with oxygen or air which is heated to a sufficiently high temperature,

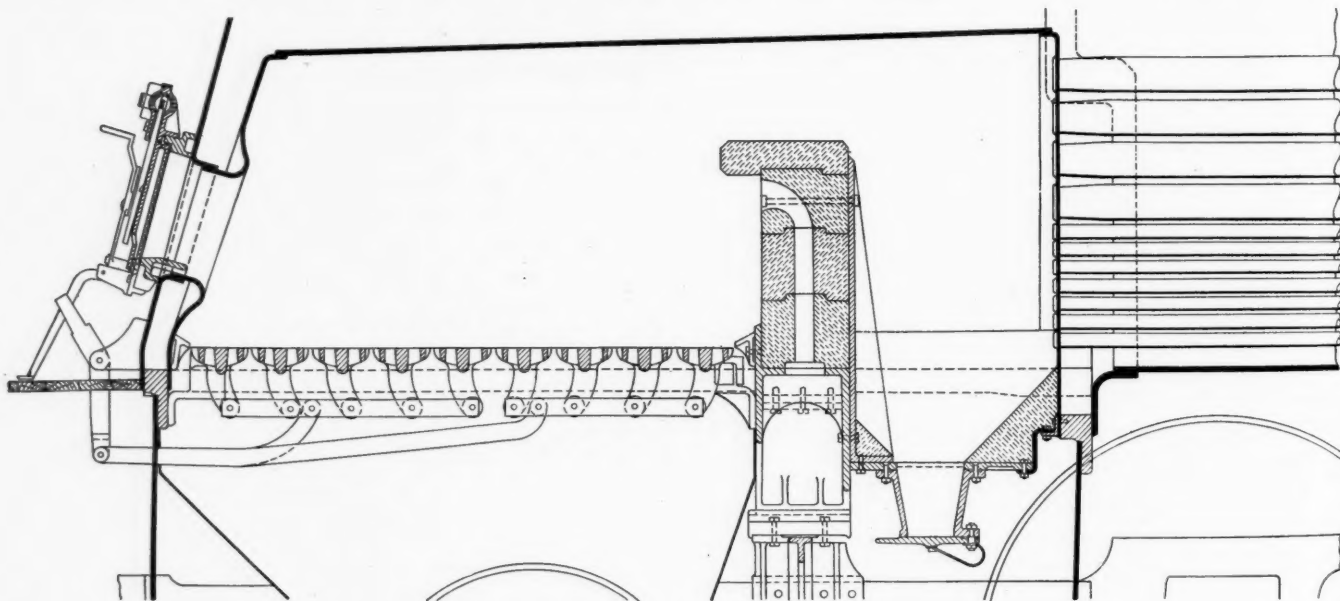


Fig. 1—Gaines Combustion Chamber Applied to a Pacific Type Locomotive.

instructions, and not enough attention has been given to the design and equipment of a locomotive firebox that can be fired by the average fireman, with an ordinary grade of coal, under every day conditions and without making smoke.

Bituminous coal, which is used almost exclusively for locomotive purposes in this country, is not a homogeneous substance and cannot be successfully treated as such. This fact has been appreciated by some engineers in designing furnaces for stationary power plants; but locomotive designers and builders have for the most part either ignored the characteristics of their principal fuel or have been influenced by the limiting conditions of weights, clearances and possible complications in firebox construction, to such a degree that they have done comparatively little along this line, and today the fire brick arch of Security type is the only device that is used to any extent as an aid to combustion in locomotive fireboxes.

Bituminous coal consists principally of fixed carbon which burns on the grate with little or no flame, and volatile matter which burns above the fuel bed with a long flame. In order

it will be completely burned to carbon dioxide; otherwise, the gases may be chilled and pass off unburned, at a loss of about 10,000 heat units per pound of carbon, since carbon burned to carbon dioxide generates 14,600 heat units, while only about 4,400 B. t. u. are produced when carbon is incompletely burned to carbon monoxide.

Bituminous coal contains from 25 to 50 per cent. volatile matter which, being rich in hydrogen, has a very high heat value, generating from 12,000 to 21,000 heat units per pound of gas. These volatile hydro-carbons, principally of the methane series, are driven off at a comparatively low temperature, when green coal is thrown on the fire, and if supplied with a sufficient quantity of heated air (or oxygen) will readily ignite. If there is no excess air above the fuel bed they pass off unburned, producing smoke and leaving behind a deposit of soot in the firebox and tubes. If there is a partial supply of air, the hydrogen, having greater affinity for oxygen than the carbon, takes up the available oxygen from the air forming steam, while the carbon is set free and either passes off in fine particles as smoke and soot or



combines with an insufficient quantity of oxygen to form carbon monoxide.

This shows the vital necessity for air above the fire, air being the medium through which oxygen is supplied; but an excess of oxygen alone is not sufficient, for flue gas analyses often show incomplete combustion with large excess of oxygen. It is important that the air be heated, as hydrogen will not combine

way can perfect combustion be obtained, yet this is a point that has been largely neglected up to the present time.

It is very apparent that the flame-way or combustion chamber space should be long enough to give the gases *time* to mix and burn completely before striking the flue sheet, for the flames are extinguished on entering the small fire tubes and combustion ceases. The advantage of a combustion chamber has been ap-

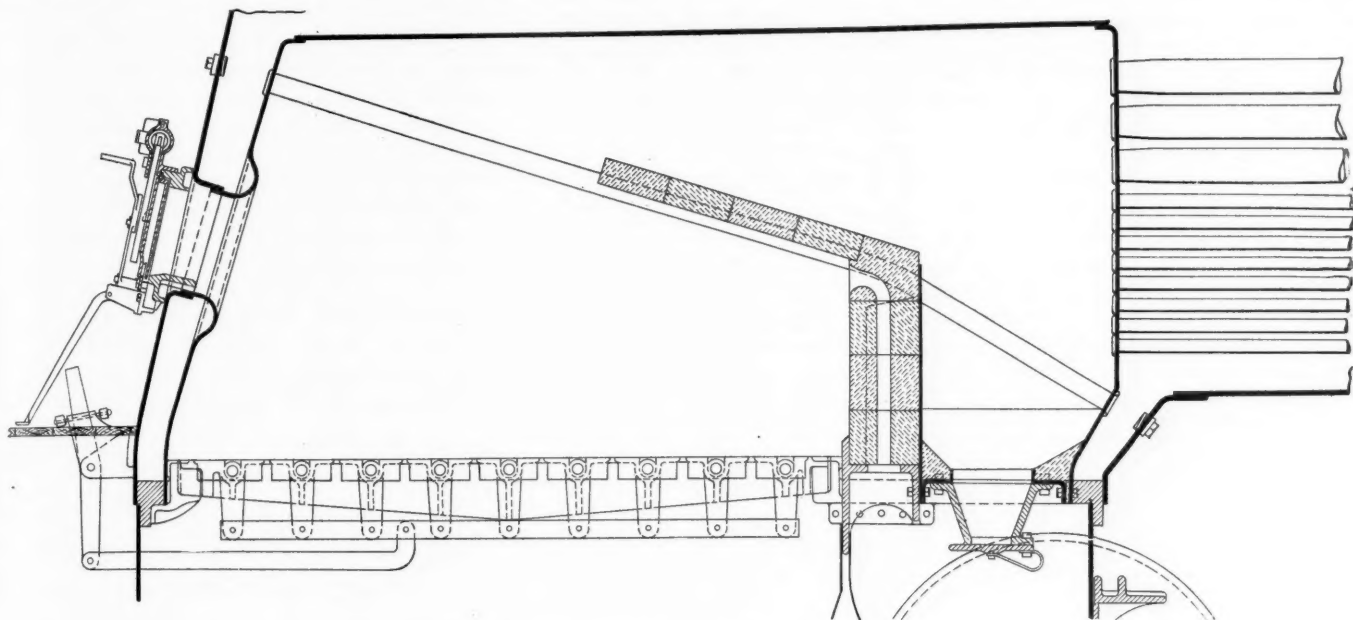


Fig. 2—Gaines Combustion Chamber Combined with the Security Arch.

with oxygen below about 600 deg. F., nor carbon with oxygen below 800 deg. F.

When air at atmospheric temperature is admitted into the firebox it has to be heated up to the igniting point before its oxygen is available for combustion, and if it enters in a large shaft, as through an open fire door, it is possible for it to flash through the firebox and into the flues before the igniting tem-

perature is reached, in which case it hinders rather than aids combustion, and at the same time endangers the flues.

#### THE SECONDARY AIR SUPPLY.

The amount of air needed above the fuel bed depends upon the composition and per cent. of volatile in the coal, the rate of

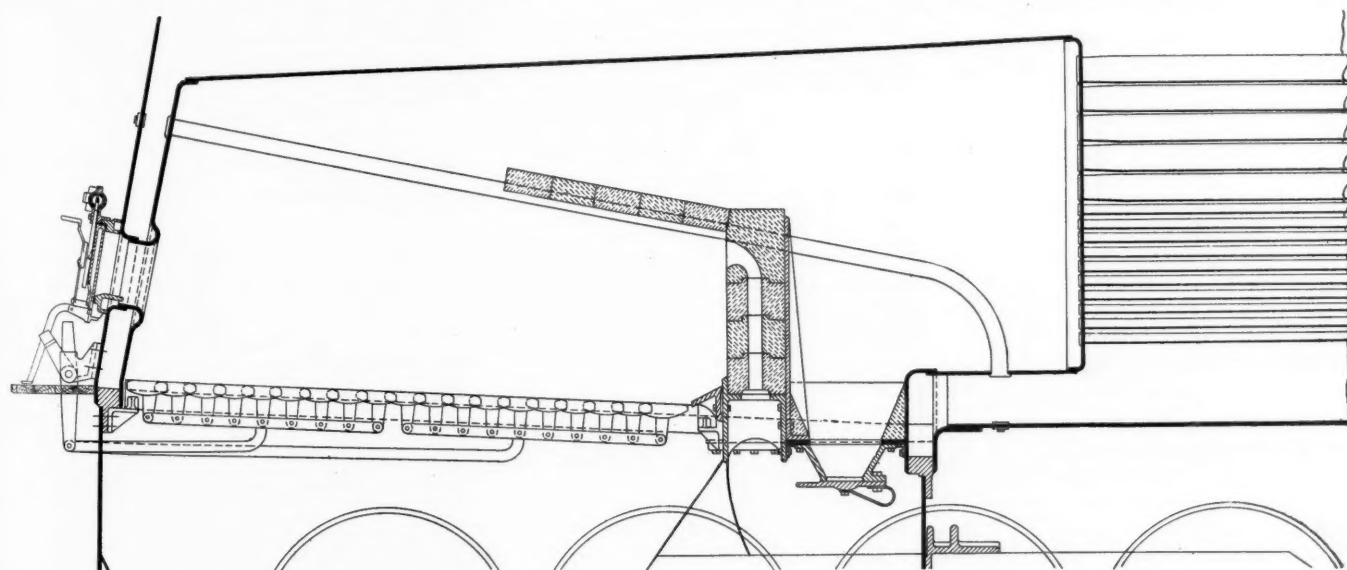


Fig. 3—Gaines Furnace with a Barrel Combustion Chamber as Applied to a Mallet Locomotive.

perature is reached, in which case it hinders rather than aids combustion, and at the same time endangers the flues.

It is necessary to have an *intimate* mixture of the volatile matter and the air in order that *every particle* of carbon and hydrogen contained in the former may come in contact with the required amount of oxygen contained in the latter. In no other

combustion, the efficiency of the gas mixing devices and the volume of the firebox and combustion chamber. That the composition and per cent. of volatile matter influences the air supply is very apparent. Since all the volatile matter burns above the fire, the per cent. of air required above the fire will vary with the amount of volatile in the coal and on the proportion of hy-

drogen and carbon in the gases, other things being equal, as a pound of hydrogen requires about three times as much air for complete combustion as a pound of carbon.

As the rate of combustion increases, the fire usually becomes thicker and this increase in thickness of the fuel bed, by offering more resistance to the passage of air, tends to reduce the air supply above the grates at a time when it needs to be increased, owing to larger volume of volatile gases being distilled and to the increase in the amount of carbon monoxide reduced from carbon dioxide in passing up through the thicker bed of coals.

The efficiency of a gas mixing device has a direct bearing on this secondary air supply. If it were possible to get a perfect mixture of the combustible gases with the air, the theoretical amount of air required would be sufficient to assure each molecule of methane, carbon monoxide, hydrogen or other combustible meeting with its needed oxygen; but in actual practice such a condition is impossible and it becomes necessary to supply an excess of air in order that each molecule of combustible gas may readily find its mede of oxygen in the short time available, for the gases linger in the firebox only the fractional part of a second even under medium rates of combustion, and when the rate is high the time is almost nil.

Increase in firebox and combustion chamber volume promotes

holds true for solids as well as gases. We see it illustrated in every-day practice at the blacksmith's forge, in our domestic heaters and in a locomotive firebox.

A pound of carbon when burned will give off 14,600 heat units. The amount of heat given off is unaffected by the speed of combustion if the combustion is perfect, but when we wish to increase the degree of heat or raise the temperature it is necessary to increase the speed of combustion, and this is accomplished by supplying more air, or increasing the draft.

What has been said in the preceding paragraphs relates to hand-fired furnaces, but the general principles hold true for stoker firing as well. It should be stated, however, that stokers of the under-feed type have an advantage over other methods of firing in eliminating smoke. This is due to the fact that the coal is fed in slowly and heated up gradually, which results in the light-hydrocarbons being slowly driven off while the heavy "tarry" hydrocarbons, which are the principal smoke producers, are left behind and burned on the grates. With over-feed stokers or hand-firing the green coal is thrown in on top of a white hot fuel bed, is heated up instantly and the volatile matter being driven off rapidly, carries with it a large part of the tarry hydrocarbons, which pass off partly unconsumed, producing smoke, as it is impossible to hold them in the firebox until combustion is

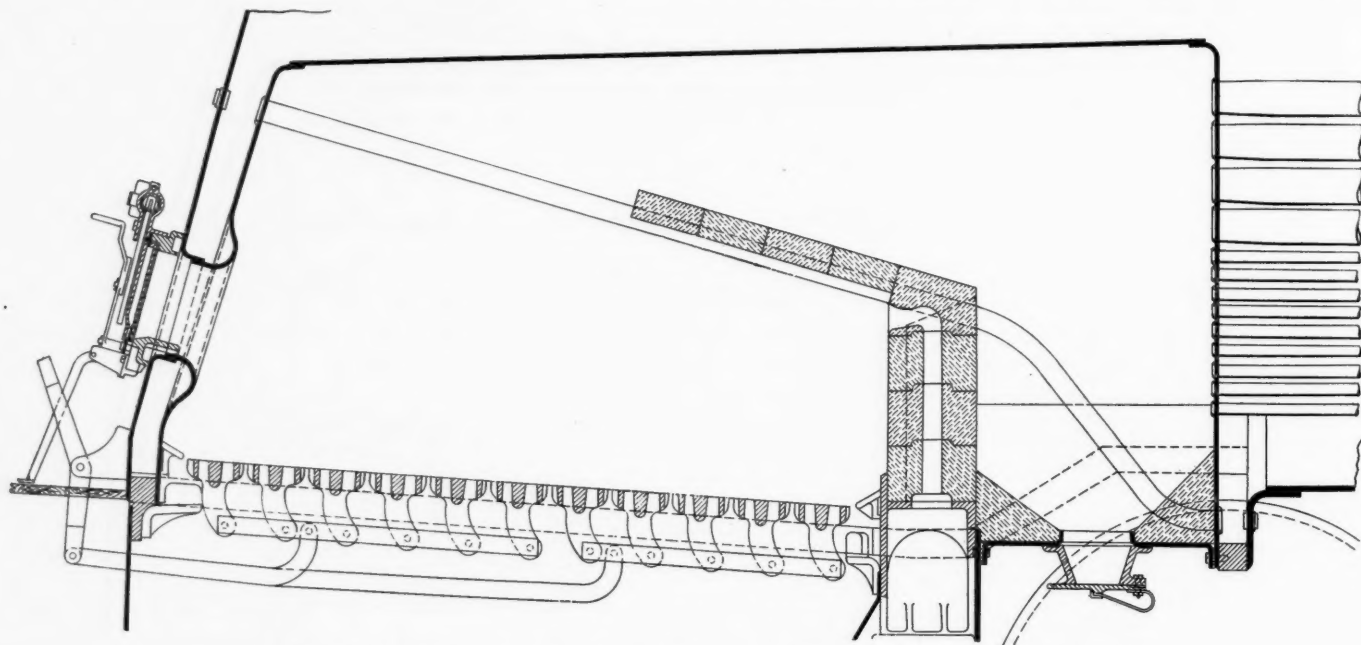


Fig. 4—Gaines Furnace as Used on a Locomotive with Large Diameter Drivers.

combustion by lengthening the flame path and giving the gases more time to mix and burn. If the firebox is shallow and the combustion chamber restricted, the flame-way and time are reduced, so it becomes necessary to increase the speed of combustion in order to burn the gases completely before they enter the fire tubes, and this can only be accomplished by increasing the air supply. When a volume of combustible gas is brought in contact with oxygen or air heated to the proper degree, a chemical reaction (combustion) begins with a high velocity, but as the reaction continues the velocity becomes less and less and combustion becomes more difficult. This is due to the fact that as combustion proceeds the amount of burned gas increases while the unburned gas and oxygen decrease, and the mass of burned gas (or product of combustion) mixing with the combustible gas and oxygen tends to separate them, makes their union difficult, and retards combustion. From this well established law of "mass action" we learn that "the speed of a chemical reaction (combustion) increases with the weight of the reacting substance in a unit of volume," though not always in direct proportion. Thus we see that an increase in air supply is all that is needed to increase the velocity of combustion, and the law

complete. With hand-firing a part of the finely powdered coal is also unavoidably lost, as it is caught up by the stream of cold air rushing through the open fire door and carried out of the firebox before combustion takes place. This condition can be helped by providing suitable baffles.

#### THE EFFECT OF EXCESS AIR.

While it is generally admitted that an excess of air is desirable as an aid to complete combustion, the objection is often raised that the excess oxygen carries with it a large per cent. of inert nitrogen which dilutes the products of combustion, absorbs heat and lowers the temperature to such an extent that the gain in combustion is more than offset by the heat losses.

It is true that the temperature falls as the air supply increases; but temperature is not the only factor that enters into the case. The heat generated on the grate of a locomotive is imparted to the firebox surface largely by radiation; that is, the heat travels directly from the fuel bed to the firebox sheets without the aid of any material agency such as the gases of combustion, and the quantity of heat so imparted depends on the temperature and area of the fuel bed, other things being equal. Since air



is practically unaffected by the action of radiant heat, it is possible that the introduction of the desired quantity of it above the fuel bed could be accomplished with little or no effect on the quantity of radiant heat imparted to the firebox heating surface.

A large part of the heat that passes out of the firebox with the gases of combustion is imparted to the fire tube heating surfaces by convection; that is, by the action of the small particles of heated gas striking against the tubes, giving up their heat and being replaced by other heated particles—a continuous interchange of cooled particles next to heating surface for heated ones from the body of the gas.

From the definition it is evident that the rate of heat transfer by convection depends on the activity or rate of interchange of the particles of gas. An interesting theory in regard to this was advanced by Professor Reynolds in a paper read before the Literary and Philosophical Society of Manchester in 1874. This was afterwards elaborated upon by Professor John Perry and has more recently received quite a bit of attention at the hands of Professor Breckenridge and others interested in the tests conducted by the government at the St. Louis fuel testing plant.

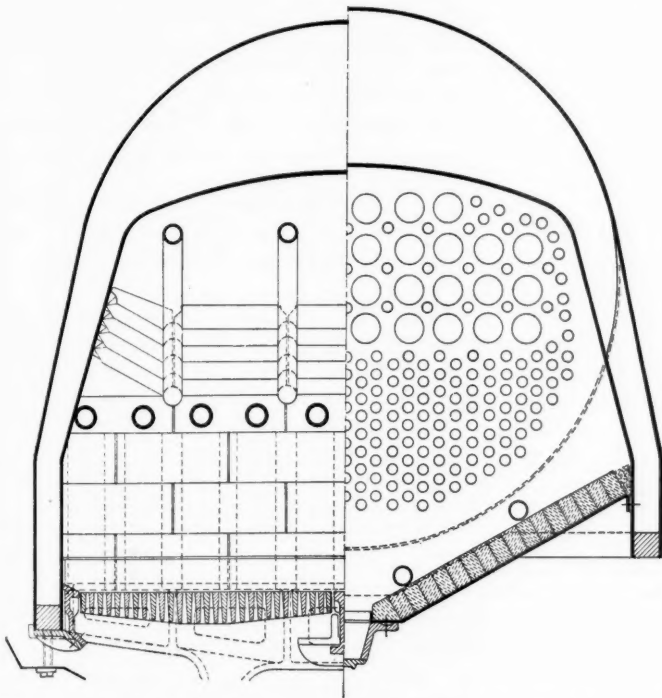


Fig. 5—Showing the Air Ducts Opening into the Firebox and the Method of Applying the Combustion Chamber Floor.

According to this theory the rate of heat transfer from the hot gases to the fire tube is "proportional to (1) temperature differences of the gases and the metallic surface; (2) density of the gases; (3) velocity of the gases parallel to the metallic surface, and (4) specific heat of gases at constant pressure. A large number of steaming tests of coals conducted by the U. S. Geological Survey gave results that seem to prove the correctness of this theory, and it has been treated quite fully in bulletins issued by the Department of the Interior.

Factor 1 is self-evident. It is also plain in studying factor 2 that since the molecules of heated gas give up their heat by striking against the metal tube, the amount of heat given off will depend on the number of blows struck. This in turn depends on the number of molecules in a unit volume of the gas, or the density of the gas. As the temperature increases, the gases expand and the number of molecules per unit of volume decrease; hence any gain by increase in temperature is partly neutralized by decrease in density.

The vital importance of the velocity of the gases (factor 3) is proved in every day locomotive practice. When we wish to

increase the capacity of our boiler we burn more coal; that is, we put a larger mass of gas through the tubes and thereby increase the velocity. "If twice the mass of gas is put through the tube per second, at the same initial temperature, very nearly twice as much steam will be generated." This is due to the fact that as the molecules of gas strike the metal of the tube and give up their heat they become more or less "bound" by the attraction of the metal and entangled with the soot film, and there is soon built up a film of cold non-conducting gas. In order to keep up the heat transfer it is necessary that the cold molecules of gas be replaced by the hot ones, and this is accomplished by the action of the hot molecules which are flying back and forth perpendicular to the surface of the tube, the dislodging and scrubbing effect of which is proportional to the velocity of the body of the gas parallel to the heating surface.

Equal volumes of all gases under the same conditions of temperature and pressure contain the same number of molecules, but since different gases on cooling give off varying amounts of heat per degree of temperature drop—have different specific heats at constant pressure—it is evident that the same number of blows struck by the molecules of different gases will result in different amounts of heat transfer; hence factor 4.

According to the tentative formula proposed by Professor Perry the rate of heat transfer from the gases to a unit area of fire tube per second is proportional to the product of the above four factors. This being the case, it is evident that any decrease in temperature, due to increasing the air supply, is partly neutralized by an increase in the volume (velocity) and density of the products of combustion, and the product of the four factors decreases but little as the air supply is increased—the specific heat being taken as a constant (.24) without serious error.

A pound of carbon requires about 11.6 lbs. of air for complete combustion, theoretically, but any attempt to fire a locomotive with the air supply cut down to this point would result in a heavy fuel loss due to incomplete combustion. With 100 per cent. excess air complete combustion can readily be obtained, resulting in a saving of from 15 to 25 per cent. in fuel, which more than offsets the approximately 5 per cent. loss in heat absorption due to the excess air—this loss in heat absorption being confined almost entirely to the flue surface which takes up from 50 per cent. to 60 per cent. of the heat utilized by the boiler. Perhaps 100 per cent. excess air is more than could be recommended in every day practice, this depending largely on the manner of introducing the air, the efficiency of the mixing devices, combustion chamber space, etc.; but this amount has been used in both stationary and locomotive practice with good results, and there are instances on record where boiler efficiencies as high as 84 per cent. have been obtained with 120 per cent. excess air.

Road tests on a Pacific type locomotive equipped with a Gaines furnace, of the type shown in Fig. 1, gave results that seem to check with what has been said above. With a rate of combustion of 57 lbs. per square foot of grate per hour, the flue gas analyses showed 116 per cent. excess air with an average of .015 per cent. carbon monoxide. Under these conditions the front end temperature was 465 deg. F., while the over-all efficiency of the boiler reached 80 per cent.—the equivalent evaporation per square foot of heating surface being 11.35 lbs. per hour.

It is possible that the efficiency in the above case was partly due to the fact that with perfect and smokeless combustion the heating surface was kept free from all soot accumulation, it being well established that the resistance to heat transfer from the gases to the water is due largely to the non-conducting films of soot and scale.

All locomotives equipped with the furnace mentioned above have been singularly free from accumulations on the fire side of the heating surface. The increase in air supply, resulting in high velocity of gases through the tubes, keeps them swept clear

of all fine particles of ash or cinders that carry over, and makes frequent flue blowing unnecessary.

#### THE GAINES LOCOMOTIVE FURNACE.

Primarily, a fuel bed of bituminous coal is a gas producer, and in order to get all the heat available out of the coal it is necessary to make provision for burning the combustible gases above the fuel bed. To successfully accomplish this requires:

First: A secondary supply of heated air above the fuel bed.

Second: A thorough mixture of the air and combustible gases.

Third: Sufficient flame-way or combustion chamber space.

These are the theoretical requirements. The practical man asks, How can these desired results be obtained without excessive cost and firebox complications? Can any device be installed that will turn the trick and yet be thoroughly mechanical in construction, easy to maintain, and foolproof in operation?

Profiting by several years' experience with locomotives equipped with Wooten type fireboxes, with fire brick bridge walls built across the mouth of barrel combustion chambers, F. F. Gaines, superintendent of motive power of the Central of Georgia, designed and patented a locomotive furnace of the type shown in Fig. 1. This consists essentially of a fire brick bridge wall extending across the firebox, forming a combustion chamber between the wall and flue sheet, the tubes being shortened and the firebox lengthened sufficiently to admit of this application, while the grate remains normal. The bridge wall is carried by a casting extending across the firebox and secured to the mud-ring at each side by studs. This casting also supports the grate frames; the buck stays in the rear, which prevent the wall from toppling, are likewise bolted to it. The floor of the combustion chamber is made of cast or wrought iron plates, protected with fire brick to prevent burning out. In order to take care of cinder accumulation in the combustion chamber a spark hopper is provided in the center, the floor being given sufficient pitch to cause all accumulation to drain out when the hopper is opened. The bridge wall is built up of special fire brick of such size as can be easily handled, and in these brick are cored air passages matching the openings in the carrier casting. The size and number of the air ducts vary according to the character of the fuel, area of grate and rate of combustion, as these factors determine the amount of air needed above the fuel bed.

When the locomotive is operating the wall becomes white hot, with the result that the outside air, being forced through the air ducts, under the influence of the pressure drop in the firebox, is heated up quite appreciably before being discharged into the firebox. As it issues from the ducts near the top of the bridge wall the heated air comes in contact and mixes with the combustible gases that are forced to pass up over the top of the wall. Combustion begins the instant the air comes in contact with the gases and the reaction continues until the combustible gases are all burned to carbon dioxide, or the flames are extinguished on entering the tubes. (In case the combustion chamber space is limited and the flame-way is short, the air supply should be large in order that combustion proceed rapidly and the flames burn out completely before striking the flue sheet.)

In Fig. 1 the wall is shown extending up to within 15 inches of the crown sheet, as in practice it has been found desirable to carry the wall as high as possible without obstructing the draft; this increases the baffling effect and promotes the mixture of the air and gases. Aside from its aid to combustion, this wall also offers complete protection to the flues. The combustion chamber being made thoroughly air tight, it is very evident that it would be impossible for any cold air to reach the flues through a hole in the fire or through an open fire door, for air entering through either of these places would be forced to pass up over the wall and come in contact with the flames, hot gases and incandescent brick, thereby being heated up and rendered harmless before reaching the flues.

The first locomotive equipped with this device has been in

service about four years and it has proved an unqualified success in improving the steaming qualities, saving fuel, reducing smoke and cinder nuisance and prolonging the life of the flues. The success of the first installation was followed by the application of the device to a number of other locomotives on several Eastern roads. All locomotives so equipped have given good service and in several ways have shown to advantage over similar engines equipped with arches, but the fact that arches of the security type were giving good service and possessed many advantages over other devices, could not be lost sight of, and after some trials the Gaines combustion chamber and Security arch were combined—the combination as shown in Fig. 2 being known as the Gaines locomotive furnace.

This combination is ideal in every respect, possessing all of the advantages of the Gaines wall and Security arch, with none of the disadvantages. The arch tubes add to the effective firebox heating surface and increase the circulation, both of prime importance. The addition of the arch back of the wall doubles the flame-way without increasing the length of the firebox, increases the effectiveness of the heating surface at the back of the firebox, increases the mixing of the air and combustible gases and on account of the longer flameway gives the gases longer time to burn, thereby reducing the amount of excess air required.

It is often impossible to apply arch tubes to fireboxes with shallow throat sheets on account of the lack of firing clearance, and in many cases it is impossible to keep the bottom tubes open because of slag and cinders going over on top of the arch and plugging them up. The bridge wall does away with these troubles. A deep throat sheet is no longer necessary for firing clearance under the arch, and any cinders or slag that pass over the bridge wall fall into the hopper from which they are easily drained at the end of the run.

A locomotive furnace of the type shown is especially adapted to overfeed stoker firing, providing, as it does, a flash wall to fire against, with an arch to baffle and hold the fine particles of coal in the firebox until they are mixed with the heated air and burned, thereby eliminating smoke and cinders and keeping the flues and tubes free from all accumulation.

The application shown in Fig. 1 is admirably adapted for locomotives in bad water districts where it is impossible to maintain arch tubes. It is effective in fuel economy, eliminates smoke and cinders and protects the flues. It is shown on a Pacific type locomotive, but can be easily applied to any other type.

The Gaines locomotive furnace is shown in Fig. 2 as applied to a Mikado locomotive, and, as pointed out, this possesses several advantages over the type shown in Fig. 1. It is equally well adapted to the Pacific, consolidation, switcher or Mallet locomotives.

The Gaines furnace applied to a Mallet locomotive firebox with a barrel combustion chamber is shown in Fig. 3. While this type of combustion chamber is not necessary with the Gaines furnace, it was used in this case to reduce the excessive length of flues and to balance the weights on drivers, it being impossible to carry the mud-ring forward to the flue sheet without interfering with the reversing gear. The barrel combustion chamber has met with much opposition in the past owing to its complications and cost of maintenance, but in recent years much of this trouble has been eliminated by the liberal use of flexible stays and by welding the seams. The large dead water space beneath the barrel has also been a source of much trouble, but this may be easily overcome by applying arch tubes as shown. Here the five 3½ in. tubes add 70 sq. ft. to the effective firebox heating surface, evaporate about 4,000 lbs. of water per hour, and produce quite a circulation in an otherwise dead water space, thereby reducing the variations in temperature around the barrel, making the expansion and contraction uniform and eliminating leaky seams and stays. A study of the illustration brings out the fact that the application of this furnace permits of great flexibility in design and location of the firebox with respect to the wheel arrangement.



The conventional type of firebox on an Atlantic, Pacific or Mikado locomotive is always located back of the rear driver, this construction being necessary in order to get the deep throat that is required to keep the grate line well below the bottom flues. On large Pacific and mikado locomotives, excessive flue lengths or the use of barrel combustion chambers necessarily follow this practice. In trying to keep the center line of the boiler as close as possible to the rails, the builders are forced to bring the firebox down close to the top of the frames and trailer wheels; this results in shallow ash-pans that burn out easily, complicated wheel housings, and, very often, insufficient air openings.

On consolidation and Mallet locomotives, the firebox being located above the drivers, the grates are placed as low as the wheels will permit—scant attention being paid to the ash-pan—while the required firing clearance between the grates and bottom flues is obtained by raising the center of the boiler to the necessary height.

The Gaines furnace, by its method of construction and application, does away with most of the bad features mentioned above. Fig. 1 shows the grates of a Pacific type locomotive raised up on a line with the belly of the boiler, the mud-ring being carried forward above the drivers and cradled in the center, the depth of the throat being reduced to a minimum. This permits of the boiler being brought lower on the frames without impairing the ash-pan. It might appear that the reduction in firebox depth, by reducing the volume and heating surface, would lower the efficiency, but firebox volume is valuable only in so far as it increases the flame-way, and depth can be sacrificed if the length of the firebox gives the flame-way desired. The amount of radiant heat imparted to the firebox heating surface depends, as stated before, on the temperature and extent of the radiating bodies; and since the firebox receives the larger part of its heat by radiation it is evident that the extent of the heating or evaporating surface is of secondary importance.

In Fig. 2 the firebox of a Mikado locomotive is carried forward above the rear drivers; this location of the back flue sheet reduces the flues to a reasonable length without the aid of a barrel combustion chamber. The shallow throat permits the boiler to be kept well down on the frames without crowding the ash-pan, while at the same time a firebox volume, much in excess of the ordinary, is obtained.

On the Mallets shown in Fig. 3, the grates are also located above the belly of the boiler. This construction allowed the boiler to be lowered 6 or 8 in. without harm to the ash-pan, while a firebox of exceptionally large volume and long flame-way was obtained.

Where drivers of very large diameter are used a construction similar to that illustrated in Fig. 4 can be employed to good advantage. Here a firebox of normal depth is maintained, while that part of the mud-ring around the combustion chamber is carried up and over the drivers, being dropped in the front center sufficiently to take care of the throat sheet. While a little unusual, this firebox construction presents no difficulties and no trouble has been experienced with locomotives so equipped. It will be noticed that the front of the mud-ring is directly above the pedestal and that the firebox is unsupported at this point, the weight of the grates, furnace and firebox being transferred to the frames back of the rear driver through the furnace bearer and frame brace; the boiler expansion is taken care of by a sliding connection between these castings. This feature is illustrated in Fig. 5, which also shows the air ducts opening into the firebox and the method of applying the combustion chamber floor.

#### SUMMARY.

While the locomotive has been greatly improved in general design and refinement of details during the last few years, but little attempt has been made to improve the evaporative efficiency of the locomotive boiler. The demand for more steam, following the increase in size of cylinders and rise of pressure, has been met by increasing the size of the boiler and not by increas-

ing its evaporative power, although the superheater, by improving the quality of the steam, has reduced the demand on the boiler.

It is possible that future builders will be forced to pay much attention to the design of a furnace that can be fired by the average fireman in such a manner as to get all of the available heat out of the coal, and to arrange the heating surface so as to readily absorb the heat made available. With our present design of firebox and boiler, an evaporation of about 52 lbs. per square foot of firebox heating surface, and 8 lbs. per square foot of tube heating surface has been obtained. An evaporation of 90 lbs. per square foot from experimental boilers in laboratory practice, without injury to the plates, would seem to indicate that the practical limit has not yet been reached.

The firebox has been correctly called the "business end" of the locomotive. If a big business is desired a big firebox with ample grate area and long flame-way is necessary. A large grate covered with a white-hot fire—in conjunction with a mass of incandescent brick work, properly arranged, and a long combustion chamber filled with flames—gives a very extensive radiating surface from which the heat readily passes to the surrounding firebox sheets.

The increased heating surface on the modern locomotive boilers has been obtained by increasing the number and length of the flues, and the fact that the front end temperatures on locomotives with tubes 20 to 24 ft. in length are but little, if any, lower than the temperatures on locomotives with tubes from 12 to 16 ft. long, would seem to indicate that the heating surface gained by excessive flue lengths is largely "conversational"—nice to talk about, but of little practical value. Shorter tubes and longer fireboxes and combustion chambers would probably improve the steaming qualities of the boiler, while an increase in the velocity of the gases over the heating surfaces, and an increase in the circulation of the water around the heating surfaces will result in increased evaporation until the point of "critical velocity" is reached.

The problem of increasing boiler efficiency should be attacked from the firebox end. First, get a furnace with which it is possible to approximate perfect combustion with ordinary firing, thereby making available all of the heat contained in the coal, and then locate and distribute the heating surface so as to readily absorb the heat made available—a difficult problem, but worthy of study and effort.

#### ACCIDENT BULLETIN NO. 45.

The Interstate Commerce Commission has issued Accident Bulletin No. 45, containing the record of railway accidents in the United States during the three months ending September 30, 1912. The number of persons killed in train accidents was 288 and of injured, 4,598. The total number of casualties of all classes including "industrial accidents" amounted to 3,109 killed and 51,331 injured. These are summarized as follows:

Causes	TABLE NO. 1—CASUALTIES TO PERSONS—STEAM RAILWAYS.							
	Passengers (classes a, b, and bb)		Employees (including employees not on duty)		Other persons (trespassers and non- trespassers)		Total persons	
	Kil'd	Inj'd	Kil'd	Inj'd	Kil'd	Inj'd	Kil'd	Inj'd
<i>Train accidents.</i>								
Collisions .....	74	1,101	71	869	12	21	157	1,991
Derailments .....	14	1,313	75	730	30	66	119	2,109
Miscellaneous train accidents, including boiler explosions...	...	20	11	473	1	5	12	498
Total .....	88	2,434	157	2,072	43	92	288	4,598
<i>Other than train accidents.</i>								
Accidents to roadway or bridges not causing derailment (189) ...	...	...	1	2	...	...	1	2
Other accidents (classes C-3 to C-12 inclusive) .....	68	2,313	661	12,129	1,977	3,405	2,706	17,847
Total .....	156	4,747	819	14,203	2,020	3,497	2,995	22,447

Causes	Passengers (classes a, b, and bb)		Employees (including employees not on duty)		Other persons (trespassers and non- trespassers)		Total persons	
	Kil'd	Inj'd	Kil'd	Inj'd	Kil'd	Inj'd	Kil'd	Inj'd
<i>Industrial accidents to employees.</i>								
While working on tracks or bridges...			47	6,574			47	6,574
At stations, freight houses, engine houses, etc., where no moving railroad car or en- gine is involved...			17	6,266			17	6,266
In and around shops...			17	13,831			17	13,831
On boats and wharves...			6	439			6	439
At other places...			27	1,774			27	1,774
Total .....			114	28,884			114	28,884
Grand total .....	156	4,747	933	43,087	2,020	3,497	3,109	51,331

TABLE NO. 1A.—COMPARISON WITH FORMER RECORDS.

Item	Bul- letin 45	Bul- letin 44	Bul- letin 41
Passengers killed in train accidents.....	88	14	65
Passengers killed, all causes.....	156	52	116
Employees (on duty) killed in train accidents...	153	99	104
Employees (on duty) killed in coupling.....	32	46	42
Employees (on duty) killed, total (Table 1a)....	712	554	626
Total passengers and employees (items 2 and 5, above) .....	868	606	742
Other persons killed (including trespassers, non- trespassers, and employees not on duty), all causes .....	2,127	1,696	2,016
Employees killed in industrial accidents.....	114	93	131
Grand total (items 6, 7, and 8).....	3,109	2,395	2,889

This table shows a noticeable increase in every item, in the quarter under review, over the corresponding item in the preceding bulletin, with the exception of item 4, "Employees killed in coupling," which shows a decrease of 14 killed. Compared with the same period of the preceding year all items show increases with the exception of two—employees killed in coupling and in industrial accidents. The large number of passengers killed in train accidents will be understood when it is recalled that in the quarter under review occurred the disastrous wrecks at Corning, N. Y., Wilpen (Ligonier) Pa., and Western Springs, Ill. Of the 2,020 "other persons" killed 1,663 were trespassers, of whom 39 were killed in train accidents; 313 were riding on cars or attempting to do so, and 1,254 were struck or run over by trains. This last item (1,254) is 50 per cent. larger than the number of injured in the same class.

The total number of collisions and derailments in the quarter now under review was 3,935 (1,537 collisions and 2,398 derailments), of which 171 collisions and 298 derailments affected passenger trains. The damage to cars, engines, and roadway by these accidents amounted to \$3,366,401. This sum is greater than that reported in this quarter since 1907, as will be seen by Table No. 2.

TABLE NO. 2.—COLLISIONS AND DERAILMENTS.—STEAM RAILWAYS.

Classes	Number	Damage to road and equipment	Number of persons	
			Kil'd	Inj'd
Collisions, rear .....	245	\$330,074	72	431
Collisions, butting .....	164	309,357	55	783
Collisions, trains separating .....	140	52,814	1	53
Collisions, miscellaneous .....	988	443,794	29	724
Total .....	1,537	\$1,136,039	157	1,991
Derailments—				
Due to defects of roadway.....	510	\$418,486	14	614
Due to defects of equipment.....	1,124	859,085	22	317
Due to negligence.....	131	82,214	8	100
Due to unforeseen obstruction.....	104	222,169	28	247
Due to malicious obstruction.....	18	14,455	...	49
Due to miscellaneous causes.....	511	633,953	47	782
Total .....	2,398	\$2,230,362	119	2,109
Total collisions and derailments.....	3,935	\$3,366,401	276	4,100
Total for same quarter of—				
1911 .....	3,034	\$2,533,170	189	3,776
1910 .....	3,130	2,871,501	303	3,352
1909 .....	2,751	2,316,014	180	3,341
1908 .....	2,567	1,950,408	176	2,729
1907 .....	4,279	3,605,696	309	4,534

Derailments due to defects of roadway and to defects of equipment are divided into sub classes, eight for roadway and 13 for equipment, and these are totaled in Tables 2A and 2b.

A new table, No. 1d, shows what may be called a surgeon's classification of the injuries which are classified by causes in the principal table of the bulletin. For example, of the 4,230 passengers injured in class a, 12 suffered the loss of a leg (or both legs), 10 sustained fractured skulls, 20 were scalded or burned, etc.

Three other new tables, 4A, 5A, and 8A, subdivide the causes of miscellaneous accidents on or around trains; of cases where trainmen strike overhead bridges, etc., and of miscellaneous accidents on or around trains.

Twenty pages of the bulletin are taken up with summaries of the reports, made by the chief inspector, on accidents which were investigated during the quarter. These accidents are as follows:

Delaware, L. & W.....	East Corning, N. Y.....	July 4..	Rear collision
Ligonier Valley .....	Ligonier, Pa.....	July 5..	Butting collision
Illinois Central .....	Courtland, Miss.....	July 12..	Derailment
Chicago, B. & Q.....	Western Springs, Ill.....	July 14..	Rear collision
Southern .....	Vance, Tenn.....	July 17..	Derailment
N. Y. N. H. & H.....	Stonington, Conn.....	July 25..	Rear collision
Denver & Rio Grande.....	Pueblo, Colo.....	July 31..	Derailment
Chicago, M. & P. S.....	Keechelus, Wash.....	Aug. 12..	Derailment
Cincinnati, H. & D.....	Antioch, Ill.....	Aug. 25..	Derailment
Northern Pacific .....	Hot Springs, Wash.....	Aug. 30..	Butting collision
Chicago & N. W.....	Lyndhurst, Wis.....	Sept. 1..	Derailment
Chicago, St. P. M. & O.....	Hustler, Wis.....	Sept. 2..	Derailment
Southern .....	Holton, Ga.....	Sept. 5..	Derailment
Rutland .....	Bennington, Vt.....	Sept. 7..	Butting collision
N. Y. C. & St. L.....	Erie, Pa.....	Sept. 10..	Derailment
N. Y. C. & H. R.....	East Rochester, N. Y.....	Sept. 15..	Rear collision
Louisville & Nashville.....	Kiserton, Ky.....	Sept. 20..	Collision—mis- placed switch
Pittsburgh, Shawmut & N.....	Niles, N. Y.....	Sept. 22..	Butting collision
Kansas City Southern.....	Air Line Junction.....	Sept. 26..	Butting collision

Electric railways reporting to the commission (not included in the foregoing statistics) had 107 persons killed during the quarter and 1,362 injured; and there were 52 collisions and 25 derailments. Train accidents are charged with eight fatalities; 4 passengers and 4 employees. The total number of passengers killed from all causes was 10 and of employees 19 (6 in industrial accidents). The number of trespassers struck or run over by cars was 57; 38 killed and 19 injured.

## A TRAIN (?) DESPATCHER.

Fifteen thousand cars were handled in the yards of the Buick Motor Company, of Pontiac, during the year, inclusive of the thirteen trainloads of Buicks sent to the west. Outgoing cars numbered 7,600, and incoming freight 8,000 carloads.

The company has comparatively recently installed a new system whereby a despatcher is put in charge of all inter-factory deliveries [by means of motors running in the streets]. He sits all day with a telephone receiver clamped to his ear, directing the drivers from one loading station to the next. There are 22 motor trucks and ten horse-drawn vehicles always on the job, and it is estimated that the system saves the company in the neighborhood of \$100,000 a year.

Four switch engines are kept all day, and two all night, shunting cars and making up trains in the Buick yards. Three transfer cars are kept busy at the motor building for loading during the day, and at night they are rolled up to the dock at the assembly plant.—*Michigan Manufacturer.*

RAILROAD CONSTRUCTION IN AFRICA.—The Benguela railroad, which has as its goal the Katanga copper belt, in the extreme southern section of the Belgian Congo, is, as projected, about 1,225 miles long. Of this, 425 miles, from the Katanga copper belt to the Belgian Congo frontier, is to be built by Belgian capital. The Atlantic end of this railroad was opened to traffic on September 17, 1912, for 270 miles from Lobita bay. By July, 1913, it should reach Bihi and have 325 miles of railroad under operation. Upon arrival at Huambo, a little over one mile above sea-level, the most difficult part of the line will have been finished. Should capital be found for the completion of this road, it will be a most valuable adjunct to the exploitation of the Katanga copper belt, since it will give a short-line competitor to the railroads from the south.—*Mining and Scientific Press.*



# WHY FREIGHT RATES SHOULD BE INCREASED.\*

Expenses Have Advanced, Interest Rates Have Risen and the Railways Require Larger Earnings for Proper Development.

BY DANIEL WILLARD,  
President Baltimore & Ohio Railroad.

The subject of railroad freight rates is such a large one that it would be quite impossible to discuss it at all satisfactorily within the proper limits of a letter, but a brief history of the Eastern advance rate case, otherwise known as Interstate Commerce Commission case No. 3,400, and some reference to subsequent developments in that connection, may be of interest.

In 1910 the railroads operating within what is known as official classification territory—which may be roughly described as that part of the United States bounded on the north by Canada, on the east by the Atlantic ocean, on the south by the Ohio and Potomac rivers and on the west by the Mississippi river—filed new freight tariffs, which provided for an increase of certain freight rates, chiefly those known as class rates, and the advance varied from 10 to 20 per cent.

At the request of the Interstate Commerce Commission the date when the increased rates should become effective was postponed by the carriers, and a hearing was ordered by the commission so that the railroads might have opportunity to present their case and those opposed equal opportunity to present theirs. Extended hearings were had, and as a result of it all the commission in its decision, handed down early in 1911, found, first, that the railroads had failed to establish a necessity for increased revenue.

Second, it was suggested that even though a necessity had been established, it was doubtful if the plan proposed was the right way in which to obtain such revenue. And it was further pointed out that there was a depression of all kinds of business at that time, and that the carriers ought not to expect to raise their rates when business was generally dull.

However, the commission also said, among other things, that should it come about that their views were not sustained by future developments, and should it appear at any time that there was a real necessity on the part of the carriers for increased revenue, in order that they might be in position to provide such facilities as the public required, they would, upon request, give the matter further consideration. They said they would not hesitate, under such circumstances, to authorize such rates as would be reasonable.

The carriers accepted the situation and, I am confident, made strenuous efforts to meet the conditions imposed upon them with rates then in effect. Rigid economies were enforced and vigorous efforts were made to obtain greater efficiency of operation in all departments.

In a number of important instances, since the decision above referred to, dividends have been reduced. In at least three cases receivers have assumed charge of the property.

During the first two years immediately following the decision—that is, 1911 and the early part of 1912—the commerce of the country showed little, if any, increase. But during the latter part of 1912 and the early part of 1913 there has been marked activity in business of all kinds, and the gross earnings of the railroads generally for the year ending June 30, 1913, will probably be the largest in their history. It might be thought from this that they should now be able to show sufficient surplus above interest and dividend requirements to justify such further capital expenditures as may be necessary. A careful study of the facts, however, I believe will show that this is not the case.

First of all, the rates which were in effect in 1910 have not in the aggregate been maintained—that is to say, while certain increases have been made during that time, decreases also have come about. The net result has been, for example, a reduction

in the earnings of the Baltimore & Ohio Company on the freight business handled by that company in October, 1912, of more than \$100,000 when compared with what they would have been in October, 1909. In other words, if the same rates, classifications and conditions had been in effect in 1912 that were in effect in 1909 the Baltimore & Ohio Railroad Company would have received in October, 1912, more than \$100,000 more than it did receive for the business actually handled in that month.

Not only has the general basis of rates been reduced—to some extent because of orders of the Interstate Commerce Commission, and perhaps, to an equal or greater extent by commercial conditions or influences which are beyond the power of the carriers to resist—but during the same period expenses have also very greatly increased, as explained below.

## THE HEAVY INCREASES IN EXPENSES.

Again in the case of the Baltimore & Ohio, the wage increase of 1910 amounted to approximately \$2,500,000 per year, when applied to the number of men at that time employed. The increases which have been granted—either voluntarily or by virtue of arbitration awards—within the last twelve months have resulted in adding between \$800,000 and \$900,000 more to our expenses each year. Further, as is well known, the conductors and trainmen now are engaged in taking a strike vote for the purpose of enforcing their demands, which call for an increase, I understand, of approximately 17 per cent.

Prices of various kinds of material also have advanced since 1910, notably in the case of fuel coal, ties and equipment. The coal bill of the Baltimore & Ohio Railroad amounts to, approximately, \$6,000,000 per year, and within the last two years, there has been an advance in the price of coal of upward of 10 per cent.

The increase in price of ties, while not so great in the aggregate, will be large. The prices asked and paid for locomotives and freight and passenger cars are higher today than was the case three years ago for equipment of the same kind.

Furthermore, legislation of various kinds—both state and federal—has had an important influence upon expenses. The so-called full crew bill, which has become a law in many of the States, requires the railroads to employ one extra man on all trains of more than a certain length, although the railroad managers unanimously believe the law to be unnecessary and unwise. But regardless of whether such laws are wise or not, the expense is the same and must be met.

The hours of service law, boiler inspection law, laws in various States prescribing standards of construction for caboose cars, laws with reference to the construction of postal cars, revised orders with reference to safety appliances upon new equipment, as well as upon existing equipment; laws with reference to grade separation, etc., etc.—all have tended to very greatly increase the cost of operation; and further, the public demands, expects and receives a higher standard of service in all directions than has ever been the case before.

This results, for instance, in the running of a greater number of passenger trains than the business itself would justify over the lines where the traffic is light; and also in a higher standard of freight service—that is to say, carriers are required to furnish cars more promptly, and to move them with less delay. While no one recognizes better than the railway executives that the service is not always satisfactory, and is frequently not such as they would like to furnish, I believe it is, nevertheless, a fact that, upon the whole, it is on a more satisfactory basis today than ever before, but this all means greater expense in operation.

\*An article in the Philadelphia Public Ledger.

## RISE IN INTEREST RATE AN IMPORTANT FACTOR.

Another very important element is the rate of interest which railways are obliged to pay upon new capital raised for improvements and betterments. It may be argued that the interest basis on all investments has been raised within recent years, and that the very best securities pay higher rates today than ever before, and that the railroads are not peculiar in this respect. But, even so, they are still required, in common with others, to pay a much higher rate of interest than was the case some five or ten years ago.

Ten years ago if a railroad company with well established credit decided to increase its capital for improvement purposes—we will say \$1,000,000—it was customary to assume that the interest charge on that account would be approximately \$40,000 per year. Under existing conditions, the interest charge would be between \$50,000 and \$60,000 per year as a minimum, and, in some cases, even in excess of \$60,000. This item alone, as you will see, becomes very important when large systems—like the Baltimore & Ohio—are spending upward of \$20,000,000 a year, and ought to do so, for betterments, extensions and new equipment.

Taxes have increased largely during the last three years. In the case of the Baltimore & Ohio Company, the increase in that one item since 1909 amounts to more than \$900,000 a year. I think it is perhaps not a matter of common knowledge, although one of public record, that the American railroads, as a whole, pay each year in taxes more than \$120,000,000.

The various influences which I have mentioned all have tended to reduce the margin between income and outgo. And it has become so narrow that the railroads—many of them, at least—do not feel justified in further increasing their capital charges, because the burden assumed by so doing might seriously interfere with their ability to maintain reasonable payments upon existing capital issues.

The result is that the railroads generally in official classification territory are very rapidly coming to a stop so far as matters of capital expenditures are concerned. Inasmuch as few, if any, are able to provide for new additions and improvements out of surplus earnings, it is quite certain that the railroads in the territory referred to will not be able to keep pace with the growing commerce of the country.

On that account many have felt that a moderate advance in freight rates is not only justified, but actually ought to be made at this time. Also that in view of the changes which I have referred to, the Interstate Commerce Commission would be disposed today to grant the request which the railroads contemplate making—that they be allowed to advance all freight rates in official classification territory 5 per cent.

It was suggested before, in the case known as No. 3,400, that if the railroads had established the fact that they needed additional revenue at that time, the method which they proposed for obtaining it was not the right or best way, in that it imposed increases of from 10 to 20 per cent. upon some rates, and made no increase whatever upon certain others.

It was argued, and with much force, that the relation of rates which then existed had come about through a long period of competition and regulation, and that anything which tended to disturb that relationship should be avoided, if possible. The carriers recognize the force of that argument, and, in the present instance, have recommended that the increased revenue be obtained by advancing all rates an equal amount—that is to say, 5 per cent. If this were done, it is believed that commercial conditions would be very little, if at all, disturbed thereby.

## BUSINESS CONDITIONS NOW FAVORABLE.

It also was argued in the previous case, that, even if the carriers did desire additional revenue at that time, the same condition was more or less true with all other business. That is to say, it was a period of commercial stagnation, and it was said that the carriers ought to raise their rates, if at all, during a time of commercial activity, and not when business was dull. The force of that argument also was recognized.

The volume of business which is being handled today is probably greater than at any other time in the history of the country, and profits are supposed to be upon a generally satisfactory basis. If that is true, it would seem that business ought to be able to stand, with very little discomfort, the small advance in freight rates now proposed.

This proposed increase has been considered and advocated chiefly by the officers directly in charge of the properties involved—men who, in nearly all instances, have spent their lives in the railway service, who are now salaried officers of such corporations, and who realize fully that they occupy the dual position of trustee for the owners of the properties, and also that of semi-public officials responsible to the public for the proper maintenance and operation of the properties in their charge. It would seem that their opinion in a matter of such grave importance to the country as a whole ought to be given serious consideration.

Personally I have the utmost confidence in the intelligence, fairness and patriotism of the gentlemen who constitute the Interstate Commerce Commission. I entertain no doubt whatever that when the matter reaches them they will eventually decide it in light of all the facts presented.

I believe, however, that the right solution of this case is of such importance and of such vital interest to all concerned that there ought to be, and I indulge the hope that there will be, no such general opposition to the proposed advance this time, as developed in the previous case.

The public is constantly letting it be known, and properly so, that it desires to ride in steel coaches; that it wants, when it travels, the protection of the electric automatic block; that it wants to be properly provided with cars of suitable kind when it has freight to ship, and that also it wants its freight moved promptly and with regularity to its destination, and the public is no more anxious to have all the things above mentioned, than I, as chief executive of the Baltimore & Ohio Company, am anxious to furnish them. But such things are expensive, and cannot be furnished unless the money is available; and it is not available at this time.

A 5 per cent. increase on all freight rates in official classification territory, if granted, would probably increase the gross revenue of the carriers involved upward of \$40,000,000 per year, and while that sum seems large of and by itself, it is not large when considered in connection with the whole matter. It would mean an increased average charge on all the business handled in the territory referred to of approximately 5 cents per ton; and, if I mistake not, the 5 per cent. increase which is now requested will fall short of what is reasonably necessary, unless some of the influences which have tended to increase so greatly operating expenses in recent years should in some manner be checked.

I have outlined above, in a general way, my reasons for believing that the 5 per cent. increase as requested should be granted. It is hardly necessary that I should add that the carriers expect to be able to produce ample and specific evidence to support the general statements which I have made, and I feel confident of their ability in this instance to fully sustain the burden of proof which rests upon them.

I wish to call attention again, by way of emphasis, to the fact that the men who are representing the railroads in this particular movement will be affected very little, if any, in a personal way by the outcome of this issue. They are, by virtue of their positions, the trustees of the properties, and they are also, in a very proper sense, semi-public officials charged with important public duties to perform. Should their request for increased revenue in the present instance be denied, as was the case in 1910, they will continue as they have in the past, to fulfill their obligations to the public as best they may, while at the same time not unmindful of the proper responsibility resting upon them as the fiduciary agents of those whose money has been invested in railway securities with the proper expectation of a fair and reasonable return.



I do not believe the American people, as a whole, desire to be unfair to the railroads or to those who have invested either their earnings or their inheritance in railway securities.

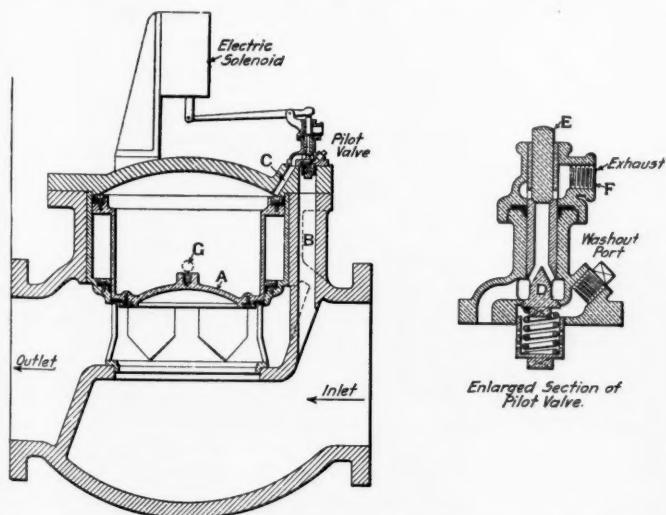
#### RAILROADS NOT A COMPLETED INSTITUTION.

If the railroads were a completed institution, and if further additions and extensions were unnecessary, the whole subject would present an entirely different phase. But they are not completed, nor will they ever be completed, so long as the commerce of the country continues to grow, and conservative estimates have shown that the roads interested in this particular case will probably be required for some years to come to raise in some manner each year for additions and betterments a sum well upward of \$500,000,000.

It is absolutely out of the question to think of providing such a sum from the surplus earnings of the roads, nor would such a policy be advocated or desired. Undoubtedly it is desirable that a considerable portion of that sum should come from each year's surplus. But much the larger part must be realized from the sale of new securities. In order that there may be a sale, it is necessary that there must also be some one to buy, and it should be remembered that the act of buying is one of purely voluntary action. But people will not buy railroad securities—which is another way of saying that they will not invest their money in railroads—unless they believe they will receive as good return upon the money so invested as they would if it were invested in some other line of undertaking with similar risk and responsibility.

### ELECTRICALLY OPERATED WATER SERVICE VALVE.

The water service valve shown in the illustration is operated by means of an auxiliary or pilot valve controlled by an electric solenoid. The illustration shows the valve in an open position and in order to close it the auxiliary valve must be opened either by means of the solenoid or by moving it by hand. When the auxiliary valve is opened, water passes through the passage *B*, through the auxiliary valve and the passage *C* to the chamber above the main valve *A*. As the upper surface



Water Service Valve Controlled by an Electric Solenoid.

of the valve *A* is greater than the lower, the difference in the pressure closes the valve. When the solenoid is released the auxiliary valve closes and the valve *D* opens, permitting the water above the valve *A* to pass through the port *C*, raise the valve *E* and escape to the atmosphere through the exhaust port *F* and the pressure of the water below the valve *A* opens it. The restricted passage of the water from above the main valve acts as a cushion to prevent it from opening too quickly and at the same time air is drawn in through the ports *G*, which acts

as a cushion to prevent the valve slamming when closing. This valve is manufactured by the Golden-Anderson Valve Specialty Company, Pittsburgh, Pa.

### CONVERTIBLE SEAT FOR COMPARTMENT CARS.

Sleeping car berths are not as wide as could be desired because of the limitations placed on the width of the cars, and the necessity of providing sufficient aisle space. In compart-



Seat End in Position for Extending Berth.

ment cars, however, where there is a separate passageway through the car outside the compartments, there is no objection to using the aisle for extending the berths, and some of the compartment sleeping cars running in the Twentieth Cen-



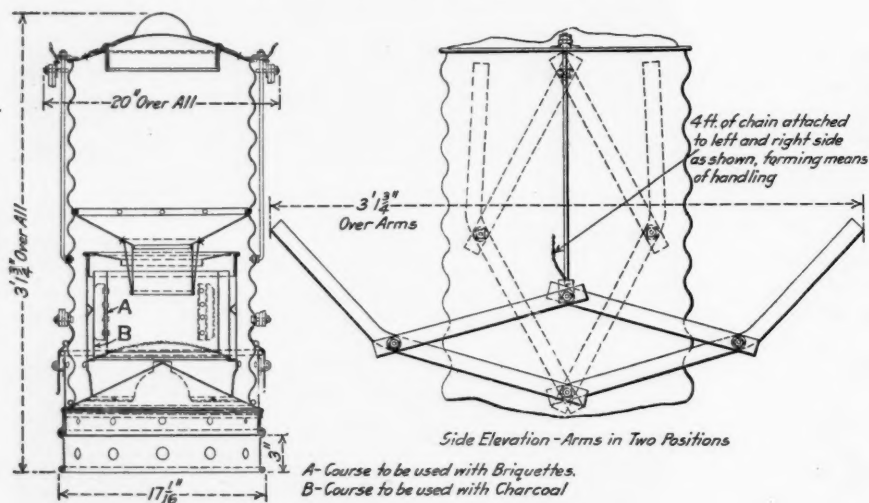
Seat End Locked in Position for Day Travel.

tury Limited are equipped with a device for this purpose. The seat ends are hinged so that they can be swung down and supported by an angle brace and form a horizontal extension of the seat. When the two seats are pulled out, as is ordinarily done in making up a lower berth, a filler is placed between the two ends after they have been lowered, thus forming a full size bed. In traveling long distances passengers frequently become tired and wish to rest during the day, and with this type of seat the end may be swung down at any time and a comfortable couch provided on which a person may stretch out at full length.

This extension seat was invented by Mrs. R. C. Smith, Chicago, Ill., and the patents are controlled by the Pullman Company.

### BAXTER CHARCOAL CAR HEATERS.

A charcoal heater that is inexpensive to operate, and one that has given efficient service in extremely low temperatures, is shown in the accompanying illustrations. The outside shell is made of corrugated metal and forms the body of the heater, supporting the magazine at the top and creating a radiating surface around the fire pot of such area as will insure all boxes and packages not catching fire should they fall against it. A positive lock on the base secures the fire pot to the shell, preventing the hot coals from being emptied from the heater into the car in the event of accident. The hasp on this lock is provided with slots for two positions, permitting the fire pot and its grate to be varied in its distance from the feed spout of the magazine, thus creating a simple means of regulating the rate



Baxter Charcoal Car Heater for Perishable Freight.

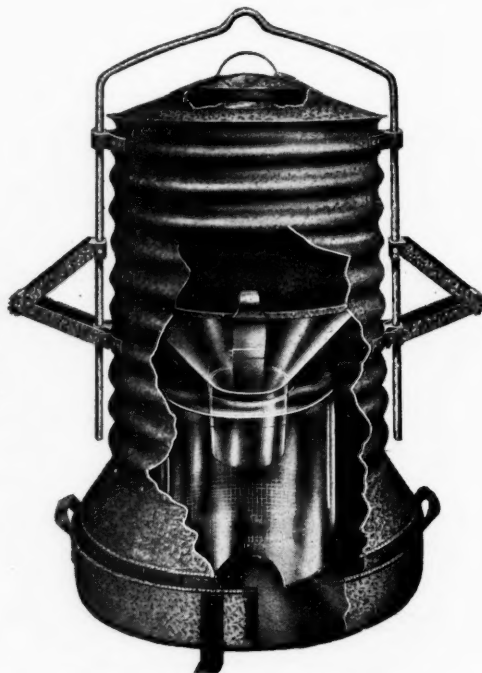
of combustion by changing the thickness of fire without altering the inlet draft passage areas.

The heaters are started by means of an igniter or "starter," which is made of blotting paper saturated in a solution of potassium nitrate and then pressed into the shape of a pie plate, being provided with a hole in the center. These starters are placed on the grate and a lighted match is applied to the edge of the hole in the center of the igniter, which burns without a flame; the magazine is then replaced and the supply slide opened. The heater is then in full operation.

A report on one of these heaters in use on a Canadian road tells of a carload of potatoes, passing through temperatures of 38 to 42 deg. below zero, being received when the outside temperature was 38 deg. below in perfectly good condition. A carload of beer, passing through temperatures of from 28 to 36 deg. below, was received with an inside temperature of 60 deg. above with the thermometer registering 35 deg. below outside of the car.

These heaters are manufactured in three sizes; the No. 1 or

the large size is designed for use in protecting less than carload business, in which service the car door on local trains is not only opened often, but is frequently allowed to remain so for many minutes, thus requiring the generation of considerable heat in a short time to again raise the temperature in the car to the proper degree. The No. 2 heater is designed to fit into the ice bunkers of refrigerator cars, and is provided with an automatic brace, as shown in one of the illustrations, which locks it fast in the center of the bunker. Two of these heaters are used with each car, one in each bunker. The No. 3 is a heater designed to meet the requirements of breweries where a suspended heater is preferable. These heaters are in a size between the No. 1 and No. 2, and are provided with heavy hooks which fasten into the screw-eyes applied to the carlines, thus suspending the heater out of the way of the kegs which are rolled on the floor of the car. The No. 2 heater will operate 36 hours without refilling, at a cost of 15 cents for the charcoal; the other heaters will operate up to 96 hours without refilling. It will be noted from the drawing that briquettes may also be used. An additional feature of the charcoal heater is the giving off of the carbon monoxide gas which not only helps to preserve any fruit or vegetable freight carried, but also kills any animal life that may be confined in the car, such as rats, mice, taran-



tulas, etc. For this reason the car should be opened a few minutes before any person is allowed to enter.

These heaters are in service on 15 railroads, including three of the larger systems of this country. They are made by the Klauer Manufacturing Company, Dubuque, Iowa.

**SURVEYS FOR AFRICAN RAILROAD.**—The surveys for the railroad from Lusambo, on the Sankuru river, to Bukama, on the Upper Congo river, are finished, and work will presumably begin upon the arrival of the Cape-to-Cairo railroad at Bukama in 1914 or 1915. The route will probably be changed, however, as further surveys are being carried on with the idea of fixing the western terminus at N'Dolo on the Lower Congo railroad near Leopoldville. The proposed new route touches Luebo, Luluabourg, Kanda Kanda, and Mutambo, Mukulu, and not Lusambo, joining the Cape-to-Cairo railroad at Lubende, some 15 miles south of Bukama. The line as outlined would be about 1,250 miles long.—*Mining and Scientific Press.*



## General News.

A. B. Garrettsen, president of the Order of Railway Conductors, was re-elected at the annual meeting of the brotherhood in Detroit last week.

On June 1, the Chicago & Alton abolished the practice of allowing train "butchers" and news agents on its trains. News agents will be permitted to canvass trains during stops at important points.

The Denver & Rio Grande and the New York, New Haven & Hartford are distributing among their agents and employees booklets, pointing out the advantages of courtesy, by Elbert Hubbard.

George Bradshaw, Highland, N. Y., formerly chief safety agent of the New York Central, has just finished a safety inspection of the shops, yards and other works of the Buffalo, Rochester & Pittsburgh; and has delivered a number of "safety-first" lectures to the employees of the road.

Following the recent action of the New York, New Haven & Hartford at its large car shops, the Boston & Maine has made a reduction of about 1 hour a day in the working time in the shops throughout its lines. It is expected that the short-time schedule will be kept in force several weeks.

The New Mexico Corporation Commission has asked the attorney general to give his opinion on the matter of compelling the Chicago, Rock Island & Pacific to comply with the provisions of statutes of New Mexico by filing articles of incorporation. The Chicago, Rock Island & El Paso, and the Chicago, Rock Island & Choctaw companies have filed their articles of incorporation with the state, but the commission seems to feel that this is not sufficient.

The Brooklyn Rapid Transit Company, operating surface and elevated street railways in Brooklyn, N. Y., announces an increase in the pay of employees, to take effect July 4 next, which will amount to from 4 to 15 per cent., the increases varying according to length of service and the records of individuals for efficiency. About 6,000 men will enjoy the benefit of this increase, and the additions to the pay roll will amount to several hundred thousand dollars a year.

The monorail extending from Bartow station on the New York, New Haven & Hartford, New York City, to Belden's Point, about 2 miles, has been given up. The company operating it, which is controlled by the Interborough Rapid Transit Company, has been reorganized, and a standard gage surface electric railroad will be put in operation over this route. The monorail was operated for passenger business a considerable length of time, but it has not given satisfaction.

The number of freight cars moved over the Middle division of the Pennsylvania Railroad in the month of May was 185,876, the heaviest movement on record. The number of cars is less than the number moved in May, 1907, but, in consequence of the large increase in the number of cars of high capacity, the amount of freight moved was greater than in the earlier period. As compared with May, 1912, the total number of cars increased about 15,000; and the increase over May, 1911, was 30,000.

The length of the lines of the Delaware, Lackawanna & Western operated by the block system is 739 miles. This is 75 per cent. of the total of the passenger lines operated by the company. An officer of the road calls attention to the fact that this percentage is not stated in the report issued by the Interstate Commerce Commission which was reprinted in the *Railway Age Gazette* of May 16, page 1059. The percentage of passenger tracks worked by the block system is 83.3, not 46.6, as stated in the report.

The O'Brien Construction Company has removed its machinery and fixtures from the line of the Southern New England Railway, an agreement having been reached between the officers of the railway and the contractors for the cancellation of their contract. It appears that the legislature of Rhode Island passed an act authorizing the lease of the road to the Central Vermont but that the governor vetoed it. John S. Murdock, vice-president of the railway company, says that there is now no hope of obtaining money until the legislature shall again meet.

A school for railroad department secretaries of the Y. M. C. A. will be conducted at Lake Geneva, Wis., July 12 to 25, at which several lectures will be given on the subject of "Safety First." Among the lecturers will be L. F. Shedd, general safety supervisor of the Rock Island lines; L. Wilbur Messer, general secretary of the Y. M. C. A.; John F. Moore, general secretary of the railroad department at New York; W. N. Northcott, general secretary of the railroad department at Chicago, and A. G. Knebel, international secretary of the railroad department.

The Canadian Pacific has raised its shopmen's pay 10 per cent.; this is the result of negotiations which have been in progress at Montreal for the past two weeks between delegates of the federated shop trades and the officers of the railway. All the employees of the mechanical and car departments on the company's eastern lines, some 9,500 in number, will benefit by the increase. Time and a half will be allowed for overtime and for work on legal holidays. The men affected by the changes, which went into effect June 2, and will continue for one year, are machinists, boilermakers, blacksmiths, brass workers, buffers, sheet metal workers, steamfitters, plumbers, general car builders and carmen, employed in the district between Port Arthur and St. John.

On the occasion of the celebration of the semi-centennial of the state of West Virginia, at Wheeling, in the week beginning June 15, the Baltimore & Ohio will make a display of locomotives illustrating the history of the steam engine in railroad service from the year 1827, when the road was begun. A number of old engines will be shown in operation under their own steam. The Hempfield yard of the road in Wheeling is directly opposite the City Hall and the railroad exhibition will be a prominent feature of the celebration. This exhibit of locomotive history will be under the direction of Major J. G. Pangborn, who directed the preparation of the great historical display of locomotives for the Baltimore & Ohio at the World's Fair in Chicago, in 1893.

D. F. Jurgensen, engineer of the Minnesota Railroad & Warehouse Commission, in a paper which is to be read before the Mississippi Valley States Convention on Railroad Valuation at Des Moines, Iowa, June 6, draws attention to what he considers an opportunity for the state railroad commissioners of the various states to aid the public in what he characterizes as "in reality a contest between the carriers and the public, with the Interstate Commerce Commission as the court or umpire to represent the public." He calls attention to the fact that at the coming valuation hearings in the question of land values, the railroads only will be represented, that the Interstate Commerce Commission will not itself be familiar with the facts, and suggests that since the state railroad commissioners are thoroughly familiar with the facts, they should represent the public in this "contest."

### Electrification and Terminal Discussion in Chicago.

The Chicago city council committee on railway terminals on June 2 voted to recommend for passage an ordinance requiring the railways of Chicago to operate their trains by motive power "other than steam, or that will not produce smoke or noxious gases," after July 1, 1915, under a penalty of \$200 for each offense. This action was taken after a series of hearings at which officials of the Chicago Association of Commerce and the executive officers of the principal railways had asked the committee to postpone consideration of the ordinance until the conclusion of the thorough investigation now being made by the association's committee on Smoke Abatement and Electrification of Railway Terminals. A report of this investigation, which has been under way for two years, is promised by January 1, 1914.

At the hearings officials of the Association of Commerce and engineers of the investigating committee have explained in detail the work which has been carried on under the direction of the late H. G. Burt as chief engineer. The aldermen were apparently influenced by an attack on the Chicago Association of Commerce made by Alderman Long, who introduced the ordinance, and who declared that the association was aiding the railways in a policy of delay. Nearly three years ago a committee of the association made an investigation, the details of which have never been made public, and reported a finding that electrification was "both practicable and feasible." The railways

were informed of the report, and at the instance of the association's officers the present committee was formed on which the railways are represented by only four members out of 17, and the railways agreed to finance a thorough investigation by competent engineers. The investigation has cost \$250,000 to date, and Hugh Patterson, electrical engineer of the committee, said at one of the hearings that it would require another year to complete the investigation along the lines mapped out, but that the report could be prepared by the first of next year by curtailing a part of the work.

The council committee on railway terminals temporarily postponed its consideration of the subject of the location of new terminals, pending its decision on the electrification question, but the matter continues to arouse a lively public discussion. Mayor Harrison has announced that he is in favor of the plan proposed by the union station roads for a new station between Jackson and Adams streets, as described in the *Railway Age Gazette* of May 23, and the west side property owners at several meetings have protested vigorously against any plan of moving the terminal south to Twelfth street, as proposed by the City Plan Commission. A committee of the Western Society of Engineers has suggested to the committee that it employ competent engineers to assist it in the consideration of the entire problem. The *Chicago Tribune* has opened its columns to the presidents of all roads entering Chicago for a discussion of the station problem, and articles have been presented by Messrs. Delano, of the Wabash; Miller, of the Burlington; Markham, of the Illinois Central; Gardner, of the Chicago & North Western; Worthington, of the Chicago & Alton; Earling, of the Chicago, Milwaukee & St. Paul, and Wood, of the Pennsylvania Lines.

The City Club has announced a series of discussions on the subject at noonday luncheons during this week and next, at which the advocates of the various plans will have an opportunity to present their views. The speakers announced include E. R. Graham, of D. H. Burnham & Company, the architects for the union station; Darius Miller, president of the Burlington; Walter D. Moody, managing director of the Chicago Plan Commission; Jarvis Hunt, Irving K. Pond and Allen B. Pond, architects, who have submitted independent plans, and F. A. Delano, receiver of the Wabash.

#### The Request for Higher Freight Rates.

The circular in which the Michigan Manufacturers' Association invites its members to express their views on the subject of a 5 per cent. horizontal advance in freight rates, deserves the sanest consideration of the members of the association. The directors of the association have tentatively endorsed the request. It seems probable that a horizontal advance will prove least burdensome and disturbing in the event that an advance has to be made. It cannot seriously disturb any competitive conditions, because it will fall evenly upon all classes of competitors and producers. With the tremendous advance in the item of taxes alone, now consuming 12.36 per cent. of the net operating revenues of the entire railroad system of the country, it would seem that government, which is the recipient of the taxes, should allow a commensurate return, from that standpoint alone, from the operations of the railroads.

This paper has devoted a great deal of its space to the discussion of the relations of the railroads and the people, and we believe that the arguments put out have met with a good deal of response. From the best study this paper can make of the subject the advances are quite necessary to the maintenance of the railroad establishment on its present plane of efficiency, and to the attraction of the new capital required to make the necessary additions to mileage and to facilities.—*Michigan Manufacturer.*

#### Flash Light Signals to Stop Motorists.

The Lehigh Valley has in use at a highway crossing at South Plainfield, N. J., a signal to warn wayfarers of the approach of trains, which gives both a visual and an audible indication; and the visual indication at night is given by means of an acetylene flash light. This device is furnished by the Commercial Acetylene Company, 80 Broadway, New York City, and the light was noticed in these columns in connection with the report of the last annual meeting of the Railway Signal Association (*Railway Age Gazette*, October 18, 1912, page 730). The

signal at South Plainfield, like a number of others on the Lehigh Valley, is in the shape of a Hall "banjo" (disk signal), having been converted from a signal formerly used as an automatic block signal. Toward the highway the light shows white when no train is approaching, and red when the track should not be crossed. The regulation of the intermittent action of the light is so adjusted that there are about 60 flashes a minute, each flash lasting about 2-5 of a second. We have spoken of the light as a warning for motorists, but, of course, it shines for all, both great and small. As flash lights are not visible elsewhere on the highways of New Jersey, persons approaching this crossing are warned in the most striking manner possible, that they are approaching a railroad crossing.

#### American Railroad Employees' and Investors' Association Discontinued.

At a meeting on April 15, the executive committee of the American Railroad Employees' and Investors' Association, having considered carefully all the conditions, the work accomplished and probable future needs and support by the membership, concluded that it is not desirable to continue the general work of the association. Accordingly further operations of the general organization and officers were ordered suspended as of June 1, 1913.

In taking this action the committee voiced its satisfaction with the work accomplished and the intention not to prejudice continuation of its branches locally where desired or further work along the lines of the movement in territories where deemed expedient. All application fees collected from employees since June 1, 1912, will be refunded.

In making this announcement the general officers of the association expressed to the members their sincere appreciation of the support and co-operation which has been rendered.

The association was organized in September, 1908, at a meeting in Chicago attended by the executive officers of the principal western railways and the chief officers of the railway brotherhoods for the purpose of promoting harmony between railways and their employees, and "to cultivate and maintain between its members such a spirit of mutual interest and such concern on the part of all of them for the welfare and prosperity of American railways as will best promote their successful and profitable operation for the benefit alike of their employees, investors and the public."

P. H. Morrissey, former grand chief of the Brotherhood of Railroad Trainmen, who has been president of the association since its organization, with office in Chicago, has, as stated elsewhere, been appointed assistant to vice-president H. E. Byram of the Chicago, Burlington & Quincy.

#### Master Boiler Makers' Association.

Officers of the Master Boiler Makers' Association have been elected as follows: President, T. W. Lowe, Canadian Pacific; first vice-president, J. T. Johnson, Atchison, Topeka & Santa Fe; second vice-president, Andrew Greene, Cleveland, Cincinnati, Chicago & St. Louis; third vice-president, D. A. Lucas, Chicago, Burlington & Quincy; fourth vice-president, J. B. Tate, Pennsylvania; fifth vice-president, C. P. Patrick, Erie; treasurer, Frank Gray, Chicago & Alton.

#### List of Exhibitors of the Track Supply Association.

The Track Supply Association will hold its exhibit at the Auditorium Hotel, Chicago, September 9-12, 1913, in conjunction with the thirty-first annual convention of the Roadmasters' and Maintenance of Way Association. The following supply concerns have already taken space: Ramapo Iron Works; The P. & M. Co.; The Rail Joint Co.; Lackawanna Steel Co.; Fairbanks-Morse Co.; Pennsylvania Steel Co.; National Lock Washer Co.; Elliott Frog & Switch Co.; The Railway Equipment & Publication Co.; Associated Manufacturers Co.; American Hoist & Derrick Co.; Fairmont Machine Co.; Simmons-Boardman Publishing Co.; *Railway Age Gazette*; *Signal Engineer*; The Joyce-Cridland Co.; Louis Blessing; James C. Barr; Q & C Co.; M. W. Supply Co.; The American Guard Rail Fastener Co.; Crerar-Adams & Co.; Templeton, Kenly & Co., Ltd.; Indianapolis Switch & Frog Co.; Union Switch & Signal Co.; Hayes Track Appliance Co.; Verona Tool Works; The



National Malleable Castings Co.; Haggard & Marcusson Co.; Positive Rail Anchor Co.; Carnegie Steel Co.; William Wharton, Jr. & Co., Inc.; Hubbard & Co.; The Hobart Allfree Co.; Hall Switch & Signal Co.; Mudge & Co.; Southern Railway Supply Co.; The Railroad Supply Co.; Sellers Manufacturing Co.; Ajax Forge Co.; Beaver Dam Malleable Iron Co.; Keystone Grinder & Manufacturing Co., Pittsburgh, Pa.; Northwestern Motor Car Co., Eau Claire, Wis.

#### American Society of Civil Engineers.

At the meeting of the American Society of Civil Engineers, held on June 4, two papers were presented for discussion as follows: The Philosophy of Engineering, by Maurice G. Parsons, Jun. Am. Soc. C. E.; and The Elevation of the Tracks of the Philadelphia, Germantown & Norristown Railroad, Philadelphia, Pa., by Samuel Tobias Wagner, M. Am. Soc. C. E. The latter paper was illustrated with lantern slides. These papers were printed in the *Proceedings* for April and May respectively.

#### Special Libraries Association.

The fifth annual convention of the Special Libraries' Association will be held at the Hotel Kaaterskill, Catskill Mountains, N. Y., June 24-26.

#### MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York. Annual meeting, October 14-15, Philadelphia, Pa.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Annual meeting, June 17-20, Buffalo, N. Y.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Friday of March and September.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 19, 1913, Chicago.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, October 21-24, 1913, Montreal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Convention, June 11-13, Atlantic City, N. J.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; annual, June, 1913.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. Annual meeting, May 28, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago. Next meeting, May, 1913, Baltimore, Md.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Semi-annual meeting, June 16, 1913, Atlantic City, N. J.; annual convention, October 18-24, Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Summer meeting, June 25-26, Charlevoix, Mich.
- ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y. Annual meeting, October 8, Philadelphia, Pa.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—H. A. Neally, Joseph Dixon Crucible Co., Jersey City, N. J. Meeting with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.
- CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.
- ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.
- FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, June 18, Bluff Point, N. Y.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.
- INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 15-18, Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Annual meeting, August 18, Richmond, Va.
- MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—W. G. Wilson, Lehigh Valley, Easton, Pa.
- MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
- MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Convention, June 16-18, Atlantic City, N. J.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Annual meeting, September 9-12, Ottawa, Can.
- NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.
- NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.
- NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. & M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.
- RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.
- RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York. Annual dinner, second week in December, 1913, New York.
- RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.
- RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo. Next meeting, August 12-15, Nashville, Tenn.
- RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Meetings, Wednesday and Thursday, June 11-12, New York; convention, October 14, Nashville, Tenn.
- RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.
- RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.
- RAILWAY TEL. AND TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.
- RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Convention, September 8-12, 1913, Chicago.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.
- TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.
- TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meeting with Roadmasters' and Maintenance of Way Association.
- TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.
- TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.
- TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago. Annual meeting, June 17, Los Angeles, Cal.
- TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.
- TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, August, 1913, Chicago.
- UTAH SOCIETY OF ENGINEERS.—R. B. Ketchum, University of Utah, Salt Lake City, Utah; 3d Friday of each month, except July and August.
- WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.
- WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock block, Chicago; 1st Monday in month, except July and August, Chicago.

## Traffic News.

Beginning June 15, the Pennsylvania Railroad will grant stop-over privileges quite generally at Harrisburg, Pa. One-way limited tickets will carry a ten-day privilege.

Beginning Monday, June 9, the Metropolitan Line will run passenger steamers direct from New York to Boston and from Boston to New York, starting from each port daily, including Sundays, at 5 p. m. The vessels to be used are the Massachusetts and the Bunker Hill, large and fast steamers. These vessels are oil burners and they have wireless telegraph apparatus.

By agreement of representatives of the railways, shippers and the Texas Railroad Commission it has been decided that the Texas commission shall institute a test suit against some of the railways terminating at Galveston, to determine the respective jurisdictions of the Texas and interstate commissions as to traffic passing over the wharves at Galveston, and destined to interior points in Texas. The question is raised with reference to the action of the roads in filing tariffs with the Interstate Commerce Commission canceling the absorption of loading charges at the Galveston wharves after June 2. The Texas commission immediately gave notice of a proposal to offset this by a horizontal reduction of two cents per 100 lbs. in the rates.

### Car Location.

The accompanying table, which is taken from car location bulletin, No. 6 of the American Railway Association, gives a summary of freight car location by groups on May 1, together with surpluses and shortages on the same date.

CAR LOCATION ON MAY 1, 1913.											
	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.
Total Cars Owned.....	87,800	677,115	277,218	202,916	171,884	478,071	17,380	150,288	33,271	130,071	131,704
Home Cars on Home Roads.....	41,905	371,719	93,917	107,373	79,987	301,875	5,426	74,754	15,172	73,254	83,980
Home Cars on Foreign Roads.....	45,895	305,396	183,301	95,543	91,897	176,196	11,954	75,534	18,099	56,817	47,724
Foreign Cars on Home Roads.....	55,570	310,635	215,143	94,160	89,158	180,678	10,660	64,902	22,725	52,717	52,054
Total Cars on Line.....	97,475	682,354	309,060	201,533	169,145	482,553	16,086	139,656	37,897	125,971	136,034
Excess or Deficiency.....	9,675	5,239	31,842	*1,383	*2,739	4,482	*1,294	*10,632	4,626	*4,100	4,330
Surplus .....	1,256	6,053	1,067	5,524	962	8,203	1,464	5,728	4,111	17,420	2,189
Shortage .....	634	1,392	1,802	2,998	2,145	1,457	0	755	260	511	2,224
Shop Cars—											
Home Cars in Home Shops .....	4,154	34,167	15,701	10,570	12,372	23,451	712	8,517	1,774	5,253	4,317
Foreign Cars in Home Shops.....	1,267	9,558	6,692	2,528	2,581	4,644	576	2,098	751	2,725	749
Total Cars in Shops.....	5,421	43,725	22,393	13,098	14,953	28,095	1,288	10,615	2,525	7,978	5,066
Per Cent. to Total Cars Owned—											
Home Cars on Home Roads.....	47.73	54.90	33.88	52.91	46.54	63.14	31.22	49.74	45.60	56.32	63.76
Total Cars on Line.....	108.67	100.77	111.39	99.32	98.41	100.94	92.55	91.16	113.90	96.85	103.29
Home Cars in Home Shops.....	4.73	5.05	5.66	5.21	7.20	5.24	4.10	5.67	5.33	4.04	3.28
Foreign Cars in Home Shops.....	1.09	1.41	2.42	1.24	1.50	1.04	3.31	1.33	2.26	2.09	.57
Total Cars in Shops.....	5.82	6.46	8.08	6.45	8.70	6.28	7.41	7.00	7.59	6.13	3.85

\*Denotes deficiency.

### INTERSTATE COMMERCE COMMISSION.

The commission has suspended from May 1 until November 1 certain tariffs, which proposed to advance rates for the transportation of various commodities between Missouri river points.

The commission has suspended until September 29 the schedules in certain tariffs which would advance rates on brick c. 1, from Athens and other points in Ohio to Huntington, W. Va. For example, the present rate on brick from Athens, Ohio, to Huntington, W. Va., is \$0.80 per 2,000 lbs.; the proposed rate, \$1.15 per 2,000 lbs.

The commission has suspended from May 30, until September 27, certain tariffs, which proposed to advance rates on lumber from shipping points on the Southern Railway in Tennessee, North and South Carolina and Georgia to Virginia cities, eastern seaboard and interior eastern points. The advances proposed range in amount from ½ cent to 5 cents per 100 lbs.

The commission has suspended from June 1 until September 29 certain schedules in Agent W. H. Hosmer's supplements, which proposed to increase rates on scrap iron and old rails between St. Paul and Duluth, Minn., and Chicago, St. Louis, Mo., and points taking same rates. The proposed increase in

the scrap iron rates amounts to from ½ cent to 2 cents per 100 lbs., and that in the old rail rates from 1.7 to 3.6 cents per 100 lbs.

The commission has suspended from May 15 until September 12 certain tariffs, which proposed to advance from 1½ to 2½ cents per 100 lbs., charges applicable to shipments of structural iron and steel stopped in transit for fabrication at fabrication points throughout Central Freight Association territory, excepting certain fabrication points located in Illinois. Under the present tariff provisions, a carload of structural iron or steel, viz., beams, plates, tees, bolts, bars, etc., shipped from Pittsburgh to Chicago may be stopped at Toledo, Ohio, to undergo further process of manufacture and then be forwarded to destination at the Pittsburgh-Chicago rate plus 1½ cents per 100 lbs. The suspended tariffs proposed to increase this charge one cent per 100 lbs. Some of the fabrication points affected are Buffalo, N. Y.; Zanesville, Ohio; Toledo, Columbus, Mt. Vernon, and Muncie, Ind.

### Coal Rates Within the Chicago Switching District.

*In re investigation and suspension of new regulations and passages governing the switching of coal and coke in carloads from connecting carriers destined to certain points on the Chicago, Milwaukee & St. Paul, located within the limits of the Chicago switching district. Opinion by Commissioner Clements:*

Coal consigned to stations on the Chicago, Milwaukee & St. Paul in Chicago is delivered to that road at Galewood, a point within the switching limits of Chicago. Hitherto, the St. Paul has received for its service from Galewood, \$4 per car of 60,000 lbs. and under, out of the joint rate from the mines, and ten cents a ton for any excess over that weight from the shipper.

The St. Paul now asks 20 cents per ton for this service. The carriers to Galewood refuse to absorb more than \$4 per car, so the increase would fall entirely on the shippers. The commission decided that the proposed increased rates had not been justified and ordered the defendant to cancel the suspended tariffs. (27 I. C. C., 71.)

### Rates on Pulp Wood Reduced.

*Pulp and Paper Manufacturers' Traffic Association, Chicago, Milwaukee & St. Paul, et al. Opinion by Chairman Clark:*

The commission decided that the rates on pulp wood in carloads from points in Minnesota to points in Wisconsin and the upper peninsula of Michigan, were unreasonable and prescribed maximum rates for the future from points in Minnesota to the gateways and to the junction points en route to the gateways, applicable upon shipments destined to points in Wisconsin and the upper peninsula of Michigan. (27 I. C. C., 83.)

### Rates on Anthracite Coal Reduced.

*Wayne R. Brown v. Boston & Maine et al. Opinion by Commissioner Meyer:*

The complainant contends that the rates on anthracite coal



from various mining points in Pennsylvania to Scotia, N. Y., are unreasonable and discriminatory against Scotia in favor of Schenectady, N. Y. Scotia is situated on the north bank of the Mohawk river, opposite Schenectady, and is connected with that city by a bridge. At present the rates on the prepared sizes, which constitute the bulk of the complainant's trade, are 20 cents higher to Scotia than to Schenectady, except on shipments moving via Mechanicville, in which case the difference is 5 cents. The 5 cents differential is held to be reasonable by the complainant, but cannot be taken advantage of on account of the increased cost of the coal at the mine from which the shipments move via Mechanicville. The complainant showed that on a large number of commodities freight rates to Scotia were the same as those to Schenectady. The defendants maintained that Schenectady was given lower rates than Scotia on account of water competition, which did not exist at Scotia. The complainant stated that the new barge canal would occupy the whole of the Mohawk river between Scotia and Schenectady, thus providing water transportation for Scotia as well as Schenectady. The commission decided that the rates complained of were unreasonable and discriminatory and prescribed reasonable rates for the future. (27 I. C. C., 47.)

#### STATE COMMISSIONS.

The newly established public service commission of West Virginia consists of the following four members, appointed by the governor on May 31: Virgil L. Highland, Clarksburg; Howard N. Ogden, Fairmont; Wade C. Kilmer, Martinsburg; Charles H. Bronson, Huntington.

A meeting of members of the state railway commissions of Missouri, Iowa, Kansas, Oklahoma, and possibly some other states, is to be held at Des Moines, Iowa, on June 6, for the purpose of deciding whether these states shall accept the physical valuation of railway property to be made by the Interstate Commerce Commission, or whether the states shall make their own valuations. The law requiring the commission to make the valuation requires that it be distributed by states.

The Minnesota Railroad & Warehouse Commission has found that questions of railroad signaling have become so important that it has deemed it necessary to appoint a signal engineer, and Wilfred Kearton, hitherto supervisor of signals on the Northern Pacific, has been appointed to that office. He will report to the chief engineer of the commission. Mr. Kearton was born in Maryport, England, June 2, 1866. He came to this country in 1884, and in 1886 went to work for the Union Switch & Signal Company. In 1887, he took a position as signal repairman on the Pennsylvania Lines west of Pittsburgh at Liverpool, Ind. With the exception of three years, during which he was occupied in signal work on British railways, Mr. Kearton remained with the Pennsylvania Lines until 1910, being signal supervisor at Pittsburgh for several years. In 1910, he went to the Northern Pacific as construction inspector, with office at St. Paul; and he had charge of the installation of automatic block signals on the St. Paul and the Minnesota divisions. Since February, 1912, he has been supervisor on the eastern district.

#### COURT NEWS.

The third court of civil appeals at Austin, Tex., has rendered a decision holding constitutional the act of the legislature in 1909, authorizing the railroad commission to order the construction of union passenger stations. It is held that unless the findings of the commission are clearly unjust and unreasonable they should not be disturbed by the courts.

The Texas law designed to compel railway companies to maintain sheds for the protection of workmen engaged in repairing cars at all repair points except those where merely light repairs are made, has been declared invalid by the judge of the district court, in sustaining a demurrer of the International & Great Northern, on the ground that the law does not define the term "light repairs."

The appellate division of the Supreme Court of New York decides that a commission merchant in New York City, sued by

the Pennsylvania Railroad for an undercharge on a freight bill, is not liable, the goods having gone out of his hands and the owner having been settled with. The shipment in question consisted of two carloads of peaches, from Georgia, in 1907. The bill, \$488, for freight and icing, was paid; but subsequently the railroad found that a mistake had been made and demanded \$3.45 additional. On refusal to pay this sum the suit was brought. A carrier is bound to collect the full lawful charges; but it does not follow that the consignee is liable; the contract was made, not with him, but with the consignor. Where a consignee accepts goods, he becomes obligated, by an implied contract, to pay the charges; but if the carrier induces him to accept the goods on the theory that the freight charges are as stated in the bill, it does not follow that the consignee is liable for an undercharge subsequently discovered. Presumptively the consignee is the owner of the goods, but this presumption is not conclusive; and in this case the consignee was not the owner. He was innocent of any intent to participate in an evasion of the law.

#### What Is Included in Interstate Commerce?

The decision of the United States Supreme Court in the case of Pedersen, a track laborer on the Delaware, Lackawanna & Western, who was held to have been engaged in interstate commerce, was noticed in the *Railway Age Gazette*, page 1201. The full text of this opinion, which was delivered by Justice Van Devanter, shows that the decision hinged on the question whether a man carrying bolts to be used in repairing a bridge was engaged in interstate commerce the same as though he had been actually at work using the bolts.

The road was engaged in interstate and intrastate commerce. Pedersen was an iron worker repairing a bridge. In carrying a sack of bolts to the place where they were to be used he had to pass over a temporary bridge, where he was run down and injured by an intrastate passenger train, of the approach of which its engineman negligently failed to give any warning. The first court held that the injury was not within the terms of the federal act. The Circuit Court of Appeals held that although this ruling was wrong, the plaintiff was not entitled to recover under the federal law, because he was not employed in interstate commerce. The Supreme Court holds that bridges are indispensable to interstate commerce; that the carrier must keep them in repair, and that this work of repair is so closely related to commerce as to be in practice and in legal contemplation a part of it. The law proceeds on the theory that the carrier must exercise due care to prevent or correct any defect in its cars, engines, machinery, tracks, roadbed, etc. The act of taking the bolts to the point where they were to be used is to be deemed a part of the work of repair. It was a minor task, but essentially a part of the larger one, as is the case when an engineman takes his engine from the roundhouse to the track on which are the cars which he is to haul in interstate commerce.

Justice Lamar dissented, and in this was joined by Justices Holmes and Lurton. Justice Lamar is unable to assent to the proposition that a man carrying bolts to be used by him in repairing a railroad bridge is employed in interstate commerce. This work was not a part of commerce, but an incident which preceded it. A line must be drawn between those employees who are employed in commerce and those engaged in other departments of the carrier's business. If a man on his way to repair a bridge is engaged in interstate commerce, then the man in the shop who made the bolts to be used in repairing the bridge is likewise so engaged. If the shopmen are to be included, then we must include the paymaster and the bookkeeper of the shop. The hours of service law shows the intent of Congress; that law applies only to those engaged in the movement of trains. The safety appliance law refers, not to machines in the shop, but to cars and locomotives, which are the immediate instruments of transportation.

**PROPOSED BRIDGE OVER THE GANGES RIVER.**—The East Indian and Bengal and North Western Railways have under consideration the question of bridging the Ganges at Mokameh. The points between them are being gradually settled. The ferry now in operation at Mokameh is worked by the Tirhoot State Railway.

## REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF MARCH, 1913.

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total.	Maintenance of way and structures, equipment.	Traffic.	Portation.	General.	Total.					
Chicago, Terre Haute & Southeastern.....	351	\$109,434	\$17,963	\$127,397	\$21,297	\$3,013	\$46,833	\$7,519	\$110,456	\$20,524	—233	\$10,000	\$20,291	—\$41,665
Oahu Railway & Land Co.....	101 <sup>a</sup>	65,298	23,763	89,061	7,769	642	23,946	4,618	44,743	52,726	—5,857	6,500	40,369	7,253
Chicago, Terre Haute & Southeastern.....	351	\$1,274,742	\$161,513	\$1,436,255	\$230,363	\$287,999	\$475,256	\$68,835	\$1,090,253	\$382,613	—\$1,751	\$90,000	\$290,862	—\$121,919
Oahu Railway & Land Co.....	101 <sup>a</sup>	610,338	205,486	815,824	79,461	5,430	190,869	41,056	373,468	501,826	9,890	55,516	456,200	58,151
Alabama & Vicksburg .....	143	\$109,849	\$34,209	\$144,058	\$24,648	\$3,432	\$56,460	\$5,366	\$120,761	\$34,546	—\$155	\$5,300	\$29,091	\$28,683
Alabama Great Southern .....	309	294,705	79,193	373,898	57,956	12,046	153,426	12,574	341,791	70,869	—1,004	14,477	55,388	—31,749
Ann Arbor .....	292	112,579	38,514	151,093	25,109	22,292	62,528	7,353	121,305	41,431	518	13,600	28,349	—2,279
Atchison, Topeka & Santa Fe.....	8,242 <sup>a</sup>	5,144,995	2,023,496	7,168,491	1,010,393	1,301,427	2,309,297	177,562	4,964,756	3,015,171	.....	339,915	2,675,256	—285,580
Atlantic & St. Lawrence.....	167	115,000	47,800	162,800	20,268	21,983	89,590	4,077	139,873	37,304	.....	16,152	21,152	16,256
Atlantic Coast Line.....	4,615 <sup>a</sup>	2,253,608	736,439	3,000,047	404,020	48,842	1,148,789	80,454	2,138,275	1,098,309	.....	112,000	986,309	—44,497
Baltimore & Ohio—System .....	4,455 <sup>a</sup>	6,050,978	1,071,452	7,122,430	1,051,371	176,487	3,051,471	178,126	6,016,199	1,550,980	—72,386	349,488	1,129,106	—988,543
Baltimore & Ohio—Terminal.....	777	.....	1,898	1,898	17,064	927	69,484	4,628	112,620	848	.....	16,051	19,076	9,063
Bangor & Aroostook .....	631 <sup>a</sup>	278,569	45,410	323,979	338,009	2,636	113,271	14,223	222,521	115,488	.....	10,500	104,320	10,686
Bessemer & Lake Erie.....	204	557,855	25,443	583,298	98,661	8,293	156,462	9,468	229,261	165,807	.....	35,000	130,807	—103,216
Buffalo, Rochester & Pittsburgh.....	574 <sup>b</sup>	679,675	84,033	763,708	119,454	12,090	275,166	18,760	596,108	197,087	—910	19,000	177,177	82,273
Carolina, Clinchfield & Ohio.....	247	201,638	13,488	215,126	17,021	6,559	37,152	11,667	95,365	123,708	.....	8,000	115,708	26,923
Carolina, Clinchfield & Ohio Rv. Co. of S. C.	18	13,259	1,343	14,602	79	1,277	3,179	938	4,009	8,421	.....	5,000	7,921	—2,121
Charleston & Western Carolina.....	341	127,570	24,596	152,166	31,294	3,523	64,956	4,608	124,154	35,749	.....	5,000	30,749	—715
Chicago & Alton .....	1,026	715,616	313,248	1,028,864	219,078	48,274	489,018	38,126	1,077,528	43,134	—4,286	45,200	—6,332	—182,441
Chicago & Eastern Illinois.....	1,275	924,748	181,105	1,105,853	128,791	26,897	504,116	37,036	928,999	274,923	—1,192	55,000	218,731	5,271
Chicago & Northwestern.....	7,976 <sup>a</sup>	4,077,852	1,475,788	5,553,640	1,034,956	112,194	2,615,090	142,640	4,836,319	1,376,157	2,291	293,000	1,085,448	—245,144
Chicago, Burlington & Quincy.....	9,129 <sup>a</sup>	4,895,966	1,529,156	6,425,122	1,702,513	117,091	2,419,725	216,609	5,749,571	1,332,028	—9,939	378,987	1,043,102	—210,821
Chicago Great Western .....	1,496	722,237	230,018	952,255	154,525	43,680	446,531	34,504	854,178	161,625	686	36,983	145,039	9,533
Chicago Junction .....	12	.....	.....	.....	18,392	944	82,648	4,495	112,029	63,977	.....	3,704	60,273	13,126
Chicago, Milwaukee & St. Paul.....	9,592 <sup>b</sup>	5,246,478	1,323,161	6,569,639	917,824	149,785	2,934,614	132,335	5,372,006	1,794,900	—7,943	315,962	1,470,995	322,265
Chicago, Rock Island & Gulf.....	477	191,035	52,123	243,158	31,722	10,240	112,722	8,233	207,577	283,588	—509	7,935	45,144	5,639
Chicago, St. Paul, Minneapolis & Omaha.....	1,744	811,921	351,616	1,163,537	178,134	26,813	521,062	30,453	950,887	298,435	—2,454	67,409	228,572	—64,075
Cincinnati, New Orleans & Texas Pacific.....	337	573,334	114,019	687,353	202,527	22,848	245,954	20,414	568,625	161,625	—177	29,000	132,446	—85,032
Colorado Midland .....	338	75,052	13,957	89,009	21,830	9,083	53,824	5,711	127,411	—27,714	—1,774	8,000	—37,488	—30,053
Cumberland Valley .....	162	246,401	50,913	297,314	50,479	5,079	96,636	7,572	198,211	110,397	65	5,702	104,760	20,353
Delaware, Lackawanna & Western.....	958	2,432,415	630,209	3,062,624	502,483	74,372	1,006,812	71,319	2,153,290	1,128,722	33,272	165,000	996,994	940,457
Detroit & Mackinac.....	411 <sup>b</sup>	80,626	26,159	106,785	11,949	3,097	37,257	2,745	70,547	43,296	—143	8,379	34,774	—8,119
Detroit, Grand Haven & Milwaukee.....	191	125,000	41,000	166,000	41,997	5,546	109,129	4,890	188,618	4,771	—83	2,953	1,735	—21,255
Duluth, Missabe & Northern.....	356 <sup>10</sup>	258,045	37,484	295,529	79,570	1,996	94,165	11,260	255,223	46,798	—957	15,361	30,480	42,781
Duluth, South Shore & Atlantic.....	627 <sup>11</sup>	194,968	73,810	268,778	48,759	8,246	117,764	7,558	223,681	61,428	—1,129	18,000	42,299	7,944
El Paso & Southwestern Co.....	982 <sup>12</sup>	583,535	106,190	689,725	118,599	17,319	212,367	26,745	474,662	247,749	—1,519	35,000	211,230	—58,405
Elgin, Joliet & Eastern.....	821 <sup>13</sup>	1,012,665	65	1,012,730	121,577	3,305	328,435	17,171	660,155	49,350	.....	49,350	382,910	30,733
Florida East Coast .....	642 <sup>14</sup>	225,417	170,527	395,944	58,960	6,673	178,307	10,262	316,936	166,384	—1,467	18,500	146,417	—49,127
Grand Rapids & Indiana.....	578 <sup>15</sup>	273,532	118,527	392,059	70,445	11,852	193,797	17,060	380,083	43,364	—79	23,640	19,645	—45,877
Grand Trunk Western .....	307	449,000	165,000	614,000	62,573	21,304	34,043	14,502	552,555	99,889	—2,580	29,877	67,482	—8,866
Gulf & Ship Island.....	308	129,947	30,328	160,275	28,224	3,108	35,253	4,341	109,859	79,629	.....	8,699	51,751	5,800
International & Great Northern.....	1,160	553,505	137,308	690,813	109,369	27,395	383,836	34,442	693,310	75,629	—1,487	30,000	48,142	—10,925
Kanawha & Michigan.....	177	205,207	27,370	232,577	34,553	2,185	75,089	6,770	171,439	67,009	34	9,517	57,526	41,279
Long Island .....	399	297,568	526,621	824,189	126,132	11,850	405,613	25,325	681,254	183,307	29,524	61,532	151,299	19,141
Louisville & Nashville .....	4,919 <sup>16</sup>	3,554,090	979,072	4,533,162	1,006,510	104,676	1,687,338	99,835	3,888,975	970,157	14,858	159,242	825,773	—25,676
Maine Central .....	1,206 <sup>17</sup>	613,536	246,484	860,020	132,704	8,161	369,253	25,082	675,070	239,371	—5,015	47,291	187,065	28,625
Midland Valley .....	373	85,041	36,096	121,137	29,968	2,550	44,106	6,387	107,916	20,631	4,985	5,964	19,652	—12,784
Minneapolis & St. Louis.....	1,586	532,735	131,524	664,259	89,968	18,717	301,327	19,947	508,591	196,734	1	33,033	163,702	56,655
Minneapolis, St. Paul & Sault Ste. Marie.....	3,976 <sup>18</sup>	2,133,063	492,917	2,625,980	293,835	50,101	878,275	62,607	1,630,765	1,967,432	—5,683	161,690	962,059	112,658
Missouri Pacific.....	3,920 <sup>19</sup>	1,486,527	376,233	1,862,760	243,995	60,522	937,208	71,527	1,638,838	419,908	—3,822	86,600	329,486	—9,981

Average mileage operated during previous period—<sup>a</sup> 99; <sup>b</sup> 18,201; <sup>c</sup> 4,536; <sup>d</sup> 4,434; <sup>e</sup> 7,951; <sup>f</sup> 9,074; <sup>g</sup> 9,570; <sup>h</sup> 358; <sup>i</sup> 342; <sup>j</sup> 624; <sup>k</sup> 902; <sup>l</sup> 841; <sup>m</sup> 630; <sup>n</sup> 586; <sup>o</sup> 4,727; <sup>p</sup> 1,204; <sup>q</sup> 3,918.

— Indicates Deficits, Losses and Decreases.



## REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF APRIL, 1913—CONTINUED.

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total.	Maintenance Way and structures.	Equipment.	Traffic.	Trans- portation.	General.	Total.				
Monongahela .....	65	\$129,598	\$2,790	\$134,455	\$19,346	\$7,943	\$291	\$26,188	\$2,083	\$55,851	\$78,604	\$3,000	\$75,604	\$10,435
Nevada Northern .....	165	121,490	18,777	138,035	17,812	17,812	3,361	31,852	69,869	88,166	68,166	6,551	61,615	27,930
New Orleans Great Northern .....	283	115,544	28,761	145,801	10,665	10,665	2,975	47,225	6,058	88,179	67,712	2,334	65,378	27,797
New York, Chicago & St. Louis .....	564 <sup>2</sup>	813,869	37,936	938,881	135,566	143,521	44,002	441,605	20,105	786,507	172,174	32,000	138,722	41,482
New York, Philadelphia & Norfolk .....	112	262,951	37,936	322,881	24,776	63,327	4,459	148,951	13,898	254,411	68,431	8,000	60,431	8,632
Norfolk Southern .....	562	235,866	55,522	311,530	37,208	35,121	4,016	98,075	10,759	185,179	126,351	7,510	118,295	2,249
Northern Central .....	47 <sup>2</sup>	846,650	189,361	1,036,011	163,261	256,872	16,024	540,662	23,143	1,001,962	104,632	42,284	62,457	55,751
Northwestern Pacific .....	401 <sup>2</sup>	102,210	144,942	271,804	39,221	44,950	3,572	113,248	13,153	131,414	57,660	13,050	44,610	9,648
Oregon Short Line .....	1,938 <sup>2</sup>	1,150,203	781,261	1,931,464	228,766	111,143	29,018	439,793	47,946	955,730	691,536	98,152	591,928	202,761
Pennsylvania Co. ....	1,751 <sup>2</sup>	3,709,102	756,309	4,465,411	1,045,431	997,053	82,926	1,982,472	116,833	4,224,715	644,589	251,995	387,886	56,348
Pennsylvania Railroad .....	4,025 <sup>2</sup>	11,073,608	2,776,380	14,850,000	2,060,403	3,240,596	204,635	5,374,124	354,451	11,234,209	3,596,071	179,925	2,830,459	142,148
Pere Marquette .....	2,330	978,213	276,429	1,254,642	276,663	255,358	31,574	570,989	32,604	1,167,188	209,043	33,075	179,081	5,748
Philadelphia, Baltimore & Washington .....	713	887,059	689,084	1,576,143	298,804	361,002	33,481	766,354	47,946	1,507,587	254,320	50,611	203,709	114,997
Pittsburgh, Cincinnati, Chic. & St. Louis .....	1,472 <sup>2</sup>	2,055,575	658,827	2,714,402	934,589	766,864	61,656	1,276,794	77,238	3,117,141	75,575	141,477	217,554	887,133
Rutland .....	468	159,926	85,876	283,691	42,799	66,459	7,360	121,601	6,581	244,800	38,891	17,607	21,284	38,192
St. Joseph & Grand Island .....	319	82,759	26,549	120,872	40,063	19,562	4,926	51,015	5,930	121,496	62,444	6,244	61,252	4,374
St. Louis, Iron Mountain & Southern .....	3,365 <sup>2</sup>	2,006,133	482,485	2,697,829	399,967	378,920	57,846	873,013	69,933	1,779,679	918,157	127,125	784,937	193,342
San Antonio & Aransas Pass .....	727	232,632	102,868	335,780	84,908	39,692	6,259	163,864	11,658	306,381	49,399	10,000	39,399	8,434
Seaboard .....	3,082 <sup>2</sup>	1,470,362	431,021	2,145,833	210,619	286,282	61,948	809,909	57,742	1,436,500	719,333	77,000	639,095	57,384
Tennessee Central .....	294	99,699	33,726	141,915	25,114	13,883	5,077	43,902	6,714	94,690	47,225	4,265	42,960	20,376
Toledo, Peoria & Western .....	248	53,739	33,160	93,483	18,518	26,722	2,490	40,343	3,462	91,535	1,948	5,900	3,952	3,771
Toledo, St. Louis & Western .....	451	327,193	371,964	699,157	43,318	42,036	14,878	131,269	8,606	240,167	131,857	14,200	117,657	9,021
Union Pacific .....	3,578 <sup>2</sup>	2,629,158	764,887	3,394,045	570,285	533,397	102,388	1,148,454	124,196	2,478,720	1,342,877	137,072	1,196,687	16,188
Union R. R. of Baltimore .....	9	130,795	24,797	155,592	10,039	10,039	1,299	5,751	2,734	19,823	137,333	5,523	132,406	33,004
Union R. R. of Pennsylvania .....	31	.....	.....	338,246	60,992	113,600	105	152,874	2,548	330,119	8,127	8,500	3,924	72,171
Vandalia .....	827	583,951	180,062	853,213	214,083	188,146	22,430	358,929	19,388	802,976	50,237	30,316	19,921	13,681
Vicksburg, Shreveport & Pacific .....	177	90,613	38,781	129,394	22,884	29,275	3,193	56,591	5,084	116,997	24,285	6,900	17,071	24,535
Virginian .....	503 <sup>2</sup>	470,991	26,605	510,567	510,567	102,592	4,893	116,031	9,293	298,195	212,372	17,600	201,005	68,743
West Jersey & Seashore .....	356	144,972	240,362	411,324	86,263	87,595	16,209	211,308	14,233	415,408	4,084	27,309	35,025	124,214
Yazoo & Mississippi Valley .....	1,374	588,836	155,408	812,219	232,339	145,423	14,155	380,983	27,879	800,779	11,440	37,000	23,962	100,596
Alabama & Vicksburg .....	143	\$1,048,927	\$405,908	\$1,561,577	\$240,531	\$290,016	\$35,876	\$539,622	\$55,984	\$1,162,029	\$399,548	\$58,986	\$338,684	\$74,346
Alabama Great Southern .....	309	2,892,620	1,061,912	4,333,652	516,777	965,521	128,689	1,405,291	98,631	3,114,909	1,218,743	146,264	1,066,526	20,648
Ann Arbor .....	292	1,150,476	461,484	1,728,617	236,085	230,301	41,105	624,328	73,317	1,205,136	523,481	135,998	383,603	90,670
Atchison, Topeka & Santa Fe .....	8,242 <sup>2</sup>	54,592,612	21,321,505	82,801,366	13,189,960	13,740,280	1,718,562	23,745,990	1,634,744	54,029,536	28,771,830	3,399,096	25,372,734	2,260,169
Atlantic & St. Lawrence .....	167	1,089,890	291,828	1,508,463	246,857	218,635	45,657	772,016	39,450	1,322,615	185,848	117,329	68,519	87,186
Atlantic Coast Line .....	4,615 <sup>2</sup>	20,707,765	7,646,089	30,589,746	4,005,784	4,562,451	518,382	10,640,407	773,154	20,500,178	10,089,568	1,192,090	8,897,478	490,027
Baltimore & Ohio System .....	4,453 <sup>2</sup>	66,028,998	12,770,144	83,573,248	11,260,355	13,318,335	1,657,836	30,854,779	1,681,807	60,773,022	22,800,229	2,514,168	19,566,085	289,563
Baltimore & Ohio Chicago Terminal .....	77	19,791	19,791	39,582	14,590	14,590	730	17,936	873	1,908,000	773,778	105,000	667,443	189,559
Bangor & Aroostook .....	631 <sup>2</sup>	2,012,940	522,985	2,681,778	445,651	338,897	32,510	955,125	123,927	1,908,000	773,778	105,000	667,443	189,559
Bessemer & Lake Erie .....	204	6,537,419	308,285	6,956,507	815,000	1,373,454	91,637	1,745,144	110,363	4,135,658	2,620,849	.....	2,660,849	189,559
Buffalo, Rochester & Pittsburgh .....	574 <sup>2</sup>	7,649,116	943,410	8,915,411	1,230,681	1,794,487	116,852	2,951,709	187,570	6,281,299	2,634,112	178,000	2,450,227	185,728
Carolina, Clinchfield & Ohio .....	247	1,849,616	149,788	2,042,506	141,403	210,711	67,922	356,599	82,349	858,984	1,183,522	80,000	1,103,522	223,447
Carolina, Clinchfield & Ohio Ry. Co. of S. C. ....	18	115,194	16,118	133,602	8,970	882	10,716	26,526	4,799	51,893	81,709	5,000	76,709	12,072
Charleston & Western Carolina .....	341	1,242,072	302,464	1,625,818	290,089	251,444	32,997	617,385	47,047	1,238,962	386,856	50,000	336,856	29,926
Chicago & Alton .....	1,026	8,302,763	3,507,447	12,478,927	2,003,758	2,984,551	438,767	4,874,241	338,196	10,639,513	2,109,414	398,100	1,686,699	938,074
Chicago & Eastern Illinois .....	1,275	10,028,981	2,474,859	13,571,006	1,611,186	2,805,733	257,651	5,160,895	409,214	10,244,679	3,326,327	451,044	2,852,000	334,080
Chicago & Northwestern .....	7,976 <sup>2</sup>	45,525,073	17,164,398	69,149,871	8,794,187	9,831,897	1,141,909	21,412,874	1,313,622	48,223,874	20,925,997	3,010,000	17,925,047	3,858,450
Chicago, Burlington & Quincy .....	9,129 <sup>2</sup>	54,131,508	18,342,786	79,583,138	9,144,527	13,301,536	1,295,808	25,282,580	2,146,367	51,170,818	28,412,320	2,831,030	25,459,640	25,459,641
Chicago Great Western .....	1,496	8,144,514	2,620,693	11,648,530	1,340,829	1,692,175	462,715	4,642,260	344,788	8,482,767	3,165,763	355,775	2,811,036	756,978
Chicago Junction .....	12	.....	.....	1,650,240	172,990	107,143	11,377	805,808	37,343	1,134,661	19,273	.....	396,314	44,740
Chicago, Milwaukee & St. Paul .....	9,952 <sup>2</sup>	57,486,742	15,234,598	79,114,108	8,367,277	11,540,313	1,583,242	29,827,209	1,067,147	52,380,188	26,733,920	3,166,394	23,684,164	8,600,230
Chicago, Rock Island & Gulf .....	477	2,119,355	592,069	2,888,035	329,520	281,154	102,854	1,036,016	81,610	1,831,154	1,056,881	72,875	977,977	198,838

Average mileage operated during previous period—<sup>2</sup> 562; <sup>3</sup> 473; <sup>4</sup> 402; <sup>5</sup> 1,760; <sup>6</sup> 4,018; <sup>7</sup> 1,467; <sup>8</sup> 3,315; <sup>9</sup> 3,070; <sup>10</sup> 3,537; <sup>11</sup> 4,434; <sup>12</sup> 4,536; <sup>13</sup> 8,201; <sup>14</sup> 9,570.

— Indicates Deficits, Losses and Decreases.

## REVENUES AND EXPENSES OF RAILWAYS.

TEN MONTHS OF FISCAL YEAR, 1913—CONTINUED.

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) last year.
		Freight.	Passenger.	Total.	Inc. misc.	Way and structures.	Maintenance of equipment.	Traffic.	Trans- portation.	General.	Total.			
Chicago, St. Paul, Minneapolis & Omaha.	1,744	\$9,191,155	\$4,191,767	\$13,382,922	\$1,033,292	140,564	144,631	23,009	370,613	28,612	707,429	86,719	240,027	200,244
Cincinnati, New Orleans & Texas Pacific.	337	6,653,432	1,543,581	8,197,013	2,082,244	479,719	291,440	68,922	1,097,227	194,029	5,739,973	\$697,200	\$3,625,379	\$484,512
Colorado Midland.	338	6,217,264	2,153,397	8,370,661	8,630,503	206,158	1,984,847	231,130	2,501,772	56,351	2,890,530	85,600	110,169	118,021
Cumberland Valley.	162	7,215,163	581,224	7,796,387	1,580,254	286,596	1,846,103	73,931	699,205	36,351	1,382,188	59,835	903,136	163,699
Delaware, Lackawanna & Western.	958	24,600,493	6,708,147	31,308,640	2,928,427	3,920,021	5,141,359	672,940	10,368,489	664,395	20,767,204	1,418,340	11,861,678	2,436,407
Detroit & Mackinac.	411 <sup>10</sup>	673,051	287,689	960,740	1,033,292	140,564	144,631	23,009	370,613	28,612	707,429	86,719	240,027	200,244
Detroit, Grand Haven & Milwaukee.	191	1,238,997	538,784	1,777,781	2,082,244	479,719	291,440	68,922	1,097,227	194,029	5,739,973	\$697,200	\$3,625,379	\$484,512
Duluth, Missabe & Northern.	356 <sup>10</sup>	5,479,670	366,130	5,845,800	5,918,068	730,993	774,898	20,545	1,268,554	130,252	2,925,282	284,670	2,723,352	330,382
Duluth, South Shore & Atlantic.	627 <sup>11</sup>	1,830,305	791,332	2,621,637	2,621,637	550,597	335,544	99,653	1,122,338	99,653	2,202,550	308,952	2,667,348	416,611
El Paso & Southwestern Co.	982 <sup>12</sup>	5,964,109	937,334	6,901,443	7,220,259	864,587	966,361	142,949	1,988,816	262,593	4,225,306	308,952	2,667,348	416,611
Elgin, Joliet & Eastern.	821 <sup>13</sup>	10,180,180	122	10,180,302	10,993,077	1,147,282	1,690,541	49,409	3,131,675	177,470	6,196,377	306,623	4,490,077	1,262,621
Florida East Coast.	642 <sup>14</sup>	2,048,372	1,686,476	3,734,848	4,293,491	641,496	588,420	80,006	1,535,097	117,369	2,962,388	164,000	2,798,388	208,092
Grand Rapids & Indiana.	578 <sup>15</sup>	2,754,189	1,507,368	4,261,557	4,620,803	615,818	745,169	115,565	1,963,176	157,302	3,597,030	237,782	3,359,248	480
Grand Trunk Western.	347	3,937,840	1,837,009	5,774,849	6,159,248	691,770	878,773	215,568	2,682,391	156,897	4,625,379	298,771	4,326,608	22,375
Gulf & Ship Island.	308	1,273,541	1,343,704	2,617,245	1,740,141	240,896	305,370	28,313	459,366	82,577	1,116,522	69,402	534,217	55,635
International & Great Northern.	1,160	7,020,574	2,115,159	9,135,733	9,748,834	1,276,655	1,336,389	264,096	4,043,492	322,634	7,243,266	300,000	2,186,092	3,730
Kanawha & Michigan.	177	2,303,972	310,908	2,614,880	2,673,698	373,946	510,228	23,009	370,613	28,612	707,429	86,719	240,027	200,244
Long Island.	399	2,898,150	5,997,832	8,895,982	9,344,891	1,274,900	1,088,065	141,654	4,143,827	246,448	6,895,494	590,502	6,304,992	291,228
Louisville & Nashville.	4,919 <sup>16</sup>	35,918,699	10,703,283	46,621,982	49,726,295	8,549,169	9,486,916	1,046,289	16,437,297	1,141,746	36,600,519	1,555,317	35,045,192	1,383,730
Maine Central.	1,206 <sup>17</sup>	5,967,417	2,916,470	8,883,887	9,449,430	1,400,236	1,460,692	3,411	267,225	251,472	6,697,869	444,844	2,271,473	170,370
Midland Valley.	373	810,983	399,857	1,210,840	1,278,247	311,739	219,573	26,270	427,523	56,898	1,042,003	59,669	183,388	71,403
Minneapolis, St. Paul & Sault Ste. Marie.	1,586	6,211,538	1,559,898	7,771,436	8,234,701	1,031,654	1,028,839	180,221	4,843,021	208,221	5,656,188	317,100	2,261,076	1,112,265
Missouri Pacific.	3,920 <sup>18</sup>	17,222,791	4,278,327	21,501,118	26,896,368	3,644,157	3,266,442	532,644	8,403,021	565,925	15,442,466	1,464,668	10,104,963	2,487,481
Monongahela.	65	1,358,610	25,538	1,384,148	1,402,304	160,692	103,173	3,411	267,225	20,543	555,044	23,643	823,617	240,516
Nevada Northern.	165	1,170,742	148,187	1,318,929	1,354,869	150,044	158,559	3,873	306,895	36,605	655,976	62,910	635,983	47,650
New Orleans Great Northern.	283	1,051,421	298,637	1,349,058	1,371,718	131,718	131,718	25,116	437,954	65,936	888,357	22,052	866,305	50,675
New York, Chicago & St. Louis.	564 <sup>20</sup>	8,914,373	1,269,657	10,184,030	10,433,059	1,066,839	1,430,096	501,567	4,311,669	175,169	7,705,340	329,583	2,490,927	17,919
New York, Philadelphia & Norfolk.	112	2,388,453	607,221	2,995,674	3,031,362	243,498	263,498	47,035	884,046	148,669	1,790,832	75,098	938,728	68,777
Norfolk Southern.	562	1,918,796	667,221	2,586,017	2,815,121	344,809	365,773	47,035	884,046	148,669	1,790,832	75,098	938,728	68,777
Northern Central.	472 <sup>21</sup>	8,307,772	2,029,078	10,336,850	11,052,627	1,367,059	2,246,093	160,604	5,328,265	269,244	9,372,075	416,663	1,269,501	245,566
Northwestern Pacific.	401 <sup>22</sup>	1,187,767	1,612,720	2,800,487	3,028,684	433,803	409,553	36,109	1,124,585	130,526	2,134,576	1,224,732	767,376	103,468
Oregon Short Line.	1,938 <sup>23</sup>	13,429,168	4,060,137	17,489,305	18,560,272	1,971,059	2,156,480	305,868	4,714,391	435,440	9,067,034	2,247,129	7,845,705	173,389
Pennsylvania Co.	1,751 <sup>24</sup>	41,083,703	8,126,723	49,210,426	54,189,745	8,856,063	10,115,348	837,263	19,305,223	1,020,854	40,134,751	6,111,927	32,001,802	1,599,241
Pennsylvania Railroad.	4,025 <sup>25</sup>	110,323,518	30,369,221	140,692,739	150,667,040	19,678,990	32,002,977	1,961,900	54,243,220	3,540,111	111,427,198	6,111,927	32,001,802	1,599,241
Pere Marquette.	2,330	10,070,568	3,402,912	13,473,480	14,681,235	2,339,517	2,472,596	331,790	6,070,473	350,474	11,464,850	490,767	2,782,217	730,863
Philadelphia, Baltimore & Washington.	713 <sup>26</sup>	8,629,291	7,072,556	15,701,847	17,469,173	2,886,053	3,140,259	294,919	7,311,359	1,143,673	14,081,263	537,255	2,850,655	301,545
Pittsburgh, Cincinnati, Chic. & St. Louis.	1,472 <sup>27</sup>	26,142,554	6,891,822	33,034,376	36,876,826	6,050,462	7,433,726	704,314	13,620,440	722,941	28,531,883	1,403,650	6,933,151	1,182,685
Rutland.	468	1,653,754	1,008,980	2,662,734	3,056,226	373,183	421,166	62,746	1,232,253	66,246	2,377,601	147,588	531,037	127,907
St. Joseph & Grand Island.	319	863,577	326,516	1,190,093	1,308,976	284,543	194,942	48,658	589,427	55,766	1,173,336	61,529	74,424	29,126
St. Louis, Iron Mountain & Southern.	3,365 <sup>28</sup>	21,354,681	5,456,569	26,811,250	28,871,797	4,666,557	4,176,587	566,552	9,053,627	706,812	19,170,135	936,120	8,720,289	1,448,450
San Antonio & Aransas Pass.	727	2,976,227	1,752,725	4,728,952	4,364,358	696,995	529,916	61,490	1,609,791	109,261	3,067,454	115,000	2,952,454	160,187
Seaboard.	3,082 <sup>29</sup>	13,988,037	4,453,520	18,441,557	20,510,456	2,635,315	2,811,666	704,314	13,620,440	573,658	14,083,494	802,000	323,217	721,065
Tennessee Central.	294	962,204	359,065	1,321,269	1,453,316	145,316	145,316	56,920	478,728	71,517	936,790	52,400	163,697	15,180
Toledo, Peoria & Western.	248	683,651	403,465	1,087,116	1,152,887	200,733	249,998	24,308	426,778	34,973	936,790	52,400	163,697	15,180
Toledo, St. Louis & Western.	451	3,069,950	293,370	3,363,320	3,575,371	451,321	462,308	129,359	1,256,071	90,359	2,389,359	147,800	1,038,212	223,056
Union Pacific.	3,578 <sup>30</sup>	30,652,804	8,781,812	39,434,616	43,403,309	4,715,157	5,202,154	912,525	11,781,305	1,143,673	23,754,336	1,759,820	17,846,044	2,514,778
Union R. R. of Baltimore.	9	1,236,643	418,837	1,655,480	1,488,397	94,655	1,087,643	61,414	7,429,241	27,452	185,665	55,950	126,784	39,294
Union R. R. of Pennsylvania.	31	6,462,578	1,993,518	8,456,096	9,391,023	1,318,957	1,880,122	251,870	3,543,078	190,413	7,184,440	308,533	1,896,050	385,072
Vandalia.	827	882,517	440,745	1,323,262	1,443,181	276,826	287,517	33,219	470,160	51,244	1,088,966	4,264	61,434	288,517
Vicksburg, Shreveport & Pacific.	171	4,477,651	261,403	4,739,054	4,865,868	615,191	615,191	52,350	1,148,625	88,787	2,818,110	175,900	1,931,770	510,319
Virginian.	503 <sup>31</sup>	1,542,611	3,402,442	4,945,053	5,275,200	802,106	827,961	146,132	2,209,690	133,702	4,119,591	228,134	885,533	188,289
West Jersey & Seashore.	356	1,452,611	2,197,472	3,649,083	3,322,934	1,667,159	1,360,932	149,997	3,745,078	267,589	7,290,755	370,000	1,665,053	396,378
Yazoo & Mississippi Valley.	1,374	6,456,943	2,197,472	8,654,415	9,322,934	1,667,159	1,360,932	149,997	3,745,078	267,589	7,290,755	370,000	1,665,053	396,378

Average mileage operated during previous period—358; 357; 347; 345; 344; 343; 342; 341; 340; 339; 338; 337; 336; 335; 334; 333; 332; 331; 330; 329; 328; 327; 326; 325; 324; 323; 322; 321; 320; 319; 318; 317; 316; 315; 314; 313; 312; 311; 310; 309; 308; 307; 306; 305; 304; 303; 302; 301; 300; 299; 298; 297; 296; 295; 294; 293; 292; 291; 290; 289; 288; 287; 286; 285; 284; 283; 282; 281; 280; 279; 278; 277; 276; 275; 274; 273; 272; 271; 270; 269; 268; 267; 266; 265; 264; 263; 262; 261; 260; 259; 258; 257; 256; 255; 254; 253; 252; 251; 250; 249; 248; 247; 246; 245; 244; 243; 242; 241; 240; 239; 238; 237; 236; 235; 234; 233; 232; 231; 230; 229; 228; 227; 226; 225; 224; 223; 222; 221; 220; 219; 218; 217; 216; 215; 214; 213; 212; 211; 210; 209; 208; 207; 206; 205; 204; 203; 202; 201; 200; 199; 198; 197; 196; 195; 194; 193; 192; 191; 190; 189; 188; 187; 186; 185; 184; 183; 182; 181; 180; 179; 178; 177; 176; 175; 174; 173; 172; 171; 170; 169; 168; 167; 166; 165; 164; 163; 162; 161; 160; 159; 158; 157; 156; 155; 154; 153; 152; 151; 150; 149; 148; 147; 146; 145; 144; 143; 142; 141; 140; 139; 138; 137; 136; 135; 134; 133; 132; 131; 130; 129; 128; 127; 126; 125; 124; 123; 122; 121; 120; 119; 118; 117; 116; 115; 114; 113; 112; 111; 110; 109; 108; 107; 106; 105; 104; 103; 102; 101; 100; 99; 98; 97; 96; 95; 94; 93; 92; 91;



## REVENUES AND EXPENSES OF RAILWAYS.

NINE MONTHS OF FISCAL YEAR, 1913.

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance of way and structures.	Equipment.	Traffic.	Trans- portation.				
Alabama Great Southern.....	309	\$2,597,915	\$982,719	\$3,920,992	\$458,821	\$859,732	\$116,644	\$1,251,865	\$86,057	\$2,773,119	\$1,147,873	\$52,397
Arizona Eastern.....	366	1,543,950	341,386	1,991,550	223,863	152,954	23,485	504,287	76,926	981,515	1,010,035	328,654
Ann Arbor.....	292	1,037,897	422,970	1,565,881	210,977	208,009	37,081	561,800	48,964	1,083,831	482,050	91,362
Belt Ry. Co. of Chicago.....	21	2,391,216		2,391,216	142,030	317,233	4,397	1,025,340	48,993	1,337,993	853,223	787,705
Butte, Anaconda & Pacific.....	46	794,138	100,611	993,051	119,391	197,883	6,530	486,160	26,305	836,269	146,782	33,681
Central Vermont.....	411	2,026,810	842,271	3,113,945	358,087	548,787	73,531	1,570,742	76,813	2,627,960	485,985	129,989
Chicago & Eastern Illinois.....	1,275	9,104,233	2,293,754	12,367,754	1,482,395	2,573,575	230,754	4,656,778	372,177	9,315,679	3,633,269	339,350
Chicago & Erie.....	270	3,259,057	548,930	4,203,441	728,521	905,611	188,682	1,005,224	118,685	1,148,631	304,482	31,613
Chicago Junction.....	12	1,474,241		1,474,241	154,599	101,592	10,432	723,160	32,849	1,022,632	451,609	436,040
Cincinnati, New Orleans & Texas Pacific.....	337	6,080,118	1,429,562	7,900,255	751,309	1,782,320	208,282	2,555,821	173,616	5,171,348	2,728,907	203,053
Cleveland, Cincinnati, Chic. & St. Louis.....	2,014 <sup>1</sup>	17,801,161	6,000,140	25,955,443	2,921,124	4,866,939	637,291	10,133,893	515,014	19,074,281	6,881,162	593,684
Delaware & Hudson Co. R. R. Dept.....	854 <sup>2</sup>	15,247,460	2,379,906	18,231,916	1,431,124	2,605,504	211,251	6,207,912	508,940	10,961,731	7,280,185	534,439
Detroit & Toledo Shore Line.....	79	1,017,407		1,017,407	113,218	55,231	287,741	639,953	47,191	488,428	532,576	484,948
Detroit, Toledo & Ironton.....	441	1,066,567	119,767	1,282,256	290,011	207,757	24,029	639,953	47,191	1,208,941	73,315	134,093
Georgia.....	307	1,536,492	672,045	2,376,532	263,218	454,033	103,768	1,175,281	74,148	2,070,468	306,464	419,409
Georgia, Southern & Florida.....	395	1,065,250	651,187	1,964,315	233,115	362,239	69,794	786,900	83,887	1,535,935	428,380	326,841
Hocking Valley.....	323 <sup>3</sup>	4,510,322	707,975	5,685,863	576,819	1,121,998	79,833	1,700,491	125,572	3,673,933	2,011,930	161,830
Houston, East & West Texas.....	761	1,730,172	271,101	2,000,218	220,101	354,965	18,991	351,965	34,053	760,045	300,173	12,154
Houston & Texas Central.....	789	3,518,275	1,451,125	5,322,230	741,205	924,442	157,203	2,108,082	181,823	4,070,755	1,251,475	374,774
Indiana Harbor Belt.....	105			1,421,461	277,836	283,590	22,360	1,069,120	60,301	1,713,207	699,254	145,774
International & Great Northern.....	1,160	6,467,070	1,957,851	8,975,895	1,167,286	1,200,121	236,701	3,657,656	288,193	6,549,957	2,425,938	1,137,950
Lake Erie & Western.....	906 <sup>4</sup>	3,646,350	677,164	4,745,232	646,129	834,591	117,792	1,740,491	187,743	3,434,670	1,139,582	106,443
Lehigh & Hudson.....	97	1,268,710	36,840	1,356,681	164,955	200,028	11,922	430,837	38,113	905,857	450,824	11,323
Louisiana & Arkansas.....	255	1,029,392	181,814	1,257,438	197,053	191,480	21,592	377,423	44,170	792,608	465,340	88,131
Louisiana Ry. & Navigation.....	351	1,113,354	199,766	1,421,124	200,143	171,759	53,321	571,249	60,729	1,056,701	369,420	32,125
Louisiana Western.....	208	1,136,380	525,123	1,736,328	213,624	311,735	65,494	534,180	51,148	1,176,181	560,147	144,691
Louisville, Henderson & St. Louis.....	200 <sup>5</sup>	5,353,881	2,669,987	8,549,886	242,813	1,203,577	39,370	355,362	28,047	7,877,169	1,425,917	106,237
Maine Central.....	1,206 <sup>6</sup>	3,884,172	6,497,675	10,381,847	1,267,532	2,629,291	18,941	3,239,561	226,391	6,022,759	2,512,199	141,745
Michigan Central.....	1,817	17,091,591	6,497,675	25,226,428	3,071,629	3,095,938	562,481	9,252,094	780,836	18,535,311	7,693,980	41,067
Missouri, Kansas & Texas System.....	3,817 <sup>7</sup>	16,585,971	26,260,428	42,846,399	3,416,640	3,095,938	562,481	9,252,094	780,836	17,107,989	8,153,439	2,380,761
Mobile & Ohio.....	114	7,584,162	1,123,088	9,249,101	1,079,881	1,734,290	341,407	3,303,117	288,129	6,746,824	2,502,277	81,113
Morgan's La. & Tex. R. R. & S. Co.....	404	2,495,505	864,787	3,360,292	644,388	552,802	119,719	1,508,710	101,552	3,227,171	1,335,979	451,356
New Orleans, Mobile & Chicago.....	547	1,508,942	268,702	1,867,732	299,268	200,886	32,312	718,340	73,941	1,824,747	562,985	50,525
New Orleans, Texas & Mexico.....	281 <sup>8</sup>	962,498	160,532	1,210,238	207,344	107,527	30,496	535,380	77,721	938,412	284,105	77,013
New York, Susquehanna & Western.....	154 <sup>9</sup>	1,483,212	429,470	2,173,030	239,039	273,928	17,338	929,084	43,864	1,503,253	669,777	226,400
Northwestern Pacific.....	401	1,085,557	1,467,779	2,553,336	394,582	364,603	32,537	1,011,337	117,373	1,920,432	836,448	93,820
Pecos & Northern Texas.....	479	1,432,877	379,140	1,937,162	230,491	378,719	61,842	618,442	56,456	1,317,619	619,543	222,090
Peoria & Eastern.....	352	2,063,414	546,777	2,780,265	324,761	523,062	41,468	1,047,035	51,497	1,987,823	793,442	114,041
Pere Marquette.....	2,330	9,092,355	3,126,483	13,305,093	1,962,855	2,217,238	300,215	5,499,483	317,870	10,297,661	3,007,342	736,611
Pittsburgh & Lake Erie.....	223 <sup>10</sup>	12,921,224	1,290,615	14,745,119	1,462,205	2,180,928	125,444	3,300,438	236,672	7,269,687	7,475,432	1,670,805
Richmond, Fredericksburg & Potomac.....	88 <sup>11</sup>	1,103,230	763,431	2,131,836	219,482	245,289	26,393	770,735	60,918	1,322,817	809,019	185,863
St. Joseph & Grand Island.....	319	780,818	299,967	1,188,105	244,480	175,380	43,732	538,412	49,836	1,051,840	136,265	81,636
St. Louis, Brownsville & Mexico.....	518 <sup>12</sup>	1,313,332	692,322	2,151,373	341,377	231,780	42,088	1,013,133	85,055	1,713,433	437,940	23,725
St. Louis, San Francisco & Texas.....	244	843,614	272,365	1,189,037	197,851	143,180	22,846	491,495	50,169	905,541	283,496	86,423
St. Louis Southwestern.....	906 <sup>13</sup>	5,097,753	1,172,078	6,597,502	701,026	905,946	266,667	1,552,970	235,318	3,661,927	2,935,575	461,751
San Pedro, Los Angeles & Salt Lake.....	1,135 <sup>14</sup>	4,729,072	2,336,089	7,605,724	830,568	1,289,503	278,635	2,453,821	171,126	5,023,653	2,582,071	1,508,052
Southern in Mississippi.....	281	532,589	280,701	881,600	253,607	80,743	22,011	384,427	37,578	778,366	103,234	118,692
Southern Kansas of Texas.....	125	937,825	164,914	1,145,427	89,414	233,185	20,301	346,523	32,836	722,259	423,168	234,842
Tennessee Central.....	294	862,505	325,339	1,257,595	256,051	131,434	51,843	436,051	64,803	938,957	280,256	100,595
Texas & New Orleans.....	458	2,091,870	880,943	3,176,754	637,281	700,538	73,877	1,239,765	108,879	2,760,340	416,414	18,913
Toledo & Ohio Central.....	443	3,491,834	483,932	4,121,121	612,816	769,522	61,871	1,454,717	82,374	2,981,300	1,139,821	66,129
Toledo, Peoria & Western.....	248	629,912	370,305	1,059,404	182,215	223,276	21,818	386,436	31,510	845,255	214,149	18,951
Ulster & Delaware.....	129	501,775	289,626	833,237	108,283	117,055	11,281	355,237	23,468	610,242	217,213	188,124
Virginia & Southwestern.....	240	1,167,278	132,225	1,335,051	202,539	307,214	17,389	369,156	31,166	927,464	407,617	54,406
Wabash.....	2,515	16,525,425	5,479,917	24,074,628	3,009,467	4,045,462	765,319	10,048,451	579,292	18,447,987	5,626,641	669,883
Washington Southern.....	36	341,132	373,595	962,939	119,455	115,238	10,942	379,053	25,703	650,391	312,548	23,237
Western Maryland.....	543	4,646,588	736,874	5,647,541	141,181	2,448,662	120,474	4,320,131	4,320,131	1,327,131	1,147,131	578,202
Western Pacific.....	937	3,505,466	976,456	4,619,849	691,570	396,592	258,881	1,801,579	226,065	3,374,987	1,244,862	508,524
Western Ry. of Alabama.....	133	586,346	420,068	1,092,719	175,543	195,877	53,342	299,146	51,356	775,264	317,455	11,549

Average mileage operated during previous period—<sup>1</sup> 2,012; <sup>2</sup> 852; <sup>3</sup> 353; <sup>4</sup> 886; <sup>5</sup> 1,204; <sup>6</sup> 3,399; <sup>7</sup> 277; <sup>8</sup> 152; <sup>9</sup> 215; <sup>10</sup> 83; <sup>11</sup> 510; <sup>12</sup> 843; <sup>13</sup> 1,116. — Indicates Deficits, Losses and Decreases.

## Railway Officers.

### Executive, Financial and Legal Officers.

W. B. Patterson has been appointed assistant auditor of the Chicago, Indianapolis & Louisville, and W. E. Lawson has been appointed freight claim agent, with headquarters at Chicago, succeeding D. C. McNiff, transferred to other duties. The settlement of overcharge and loss and damage freight claims is now under the jurisdiction of the accounting department.

B. L. Winchell and Thomas H. West, receivers of the St. Louis & San Francisco, announce that from May 29, and acting for and under the direction of the receivers, W. C. Nixon, with the title of chief operating officer, will have charge of the maintenance and operation of the physical property; W. B. Biddle, with title of chief traffic officer, will have charge of all traffic and development matters; and A. Douglas, with title of chief accounting officer, will have charge of the books and accounts.

P. H. Morrissey, who has been president of the American Railroad Employees' and Investors' Association since January 1, 1909, has been appointed assistant to the vice-president in charge of operation of the Chicago, Burlington & Quincy, with headquarters at Chicago. Mr. Morrissey was born September 11, 1862, at Bloomington, Ill., and was educated in the public schools of that city, graduating from high school in 1879. He began railway work in 1879 as call boy in the locomotive department of the Chicago & Alton at Bloomington, and the following year entered the train service as a passenger brakeman. Subsequently he was freight brakeman and freight conductor. He left active railway service in 1890 to assume the position of Vice Grand



P. H. Morrissey.

Master of the Brotherhood of Railroad Trainmen, which organization he had joined in February, 1885. He continued in that capacity until August 1, 1895, when he became Grand Master, which office he retained until January 1, 1909. While serving as Grand Master of the Brotherhood of Railroad Trainmen in 1903, Mr. Morrissey attracted a great deal of favorable notice by his action in a controversy between the Wabash and its employees. Judge Adams of the United States Circuit Court had issued an injunction restraining the brotherhood as an organization from ordering a strike, and when the men were planning to ignore the injunction, Mr. Morrissey insisted on their respecting the order of the court while it remained in effect. The injunction was dissolved, but meanwhile an amicable settlement of the dispute was reached. He has been a leading advocate of the plan of conducting labor negotiations by groups, and has always been insistent on the inviolability of labor agreements. He was also one of the prominent advocates of the Erdman act. During the past four years Mr. Morrissey has served as arbitrator in a large number of wage controversies between railways and employees. In 1910, with Interstate Commerce Commissioner E. E. Clark, he arbitrated the demands of the conductors and trainmen on the New York Central & Hudson River, making an award which was later adopted by other lines. He also represented the enginemen in the arbitration proceedings begun in eastern territory in May, 1912, and arbitrated the demands of the enginemen, firemen, conductors and trainmen on the Coal & Coke Railway, under the Erdman act in 1911. He has served in numerous lesser wage arbitration proceedings, at times being the representative of the employees, and at other times, acting as sole arbitrator for both parties.

### Operating Officers.

J. H. Milton, superintendent car department of the Chicago Terminal division of the Chicago, Rock Island & Pacific, has had his jurisdiction extended over the entire Rock Island system.

W. R. Mann, chief despatcher of the Houston & Texas Central, has been appointed assistant superintendent, with headquarters at Ennis, Tex., in place of J. F. Sugrue.

R. C. Watkins has been appointed acting superintendent of the Galveston, Harrisburg & San Antonio, with office at San Antonio, Tex., succeeding J. E. Taussig, granted leave of absence.

J. F. Sugrue, assistant superintendent of the Houston & Texas Central at Ennis, Tex., has been appointed superintendent of the Lake Charles & Northern, with headquarters at DeRidder, succeeding John K. Fahey, resigned.

John D. Patterson, formerly superintendent of terminals of the Louisville & Nashville, at Atlanta, Ga., has been appointed general superintendent of the Panama Railroad, with headquarters at Colon, Panama, succeeding J. A. Smith, resigned.

The general headquarters of the Third district of the Chicago, Rock Island & Pacific, including the system south of Caldwell, Kan., in the states of Oklahoma, Texas, Arkansas, Louisiana and Tennessee, will be moved on June 15 from Ft. Worth, Tex., to El Reno, Okla. C. W. Jones is general manager of this district.

J. W. Knightlinger, assistant superintendent of Morgan's Louisiana & Texas Railroad & Steamship Company and the Louisiana Western Railroad at New Orleans, La., has been appointed superintendent, with headquarters at Lafayette, La., succeeding L. Mims, assigned to other duties. Mr. Knightlinger is succeeded by J. K. Fahey, heretofore superintendent of the Lake Charles & Northern.

William Lynch, trainmaster of the Texas & Pacific at Bunkie, La., has been appointed superintendent of the Rio Grande division, with headquarters at Big Spring, Tex., succeeding A. G. Whittington, resigned, to become superintendent of the San Antonio division of the International & Great Northern, with headquarters at San Antonio, in place of John R. Jones, assigned to other duties. J. M. Thompson succeeds William Lynch.

William Thomas has been appointed trainmaster of the First district, Albuquerque division, of the Atchison, Topeka & Santa Fe Coast Lines at Gallup, N. M., in place of L. M. Shipley, who has been transferred to the Second district of that division as trainmaster, with office at Winslow, Ariz., in place of A. R. Woods, acting trainmaster. Mr. Woods has been made trainmaster of the First district, Arizona division, at Needles, Cal., to succeed C. G. Fluhr, who has been transferred to Fresno, Cal., as trainmaster of the First and Visalia districts in place of J. A. Christie, promoted.

Phil. Carroll, assistant general superintendent of the Southern district of the Missouri Pacific system, has been made superintendent of the Missouri division, extending from St. Louis, Mo., to Hoxie, Ark., with headquarters at Poplar Bluff, Mo., succeeding J. Cannon, and the former position has been abolished. Mr. Cannon has been transferred to the Eastern division, extending from St. Louis to Kansas City, with office at Sedalia, Mo., in place of A. J. Alexander, who is made superintendent of the Colorado division, with headquarters at Pueblo, Colo., this division extending from Hoisington, Kan., to Pueblo, Colo. T. A. Shea, whom Mr. Alexander succeeds, has been appointed superintendent of the Valley division, which extends from Little Rock, Ark., to Ferriday, La., and Monroe, and will have headquarters at McGehee, Ark. He succeeds C. M. Alexander, resigned. Effective June 1.

J. M. Scott, whose appointment as superintendent of the Monongah division of the Baltimore & Ohio, with headquarters at Grafton, W. Va., has been announced in these columns, began railway work as an operator on the Chesapeake & Ohio in 1891. The following year he went to the Cincinnati, Hamilton & Dayton as an operator, and was promoted to train despatcher in 1895, becoming trainmaster of the same road in 1903. He was appointed superintendent in 1905, remaining in that position until August, 1910; he then went to the Kansas City Southern, and on January 1, 1911, left that company to take a position with the Indiana State Railroad Commission. On August 5, 1912, he



was appointed supervisor of transportation of the Baltimore & Ohio, and in January, 1913, became assistant superintendent of the Cumberland division at Keyser, W. Va., which position he held at the time of his recent appointment as superintendent of the Monongah division of the same road, with headquarters at Grafton, as above noted.

#### Traffic Officers.

William F. Nagle has been appointed traveling freight agent of the Lehigh Valley, with office at South Bethlehem, Pa., succeeding E. G. Baumer, deceased.

J. H. Bingham has been appointed traveling freight agent of the Missouri Pacific and the St. Louis Iron Mountain & Southern, with office at Indianapolis, Ind.

George T. Bell, assistant passenger traffic manager of the Grand Trunk and the Grand Trunk Pacific, at Montreal, Que., has been appointed passenger traffic manager of both these companies, succeeding W. E. Davis, deceased.

A. W. Crowther has been appointed general freight and passenger agent of the Sugarland Railway, with headquarters at Sugarland, Tex., succeeding C. A. Davis, resigned.

J. W. King, traveling freight agent of the St. Louis, Iron Mountain & Southern at San Antonio, Tex., has been appointed district freight agent of the International & Great Northern at that place.

T. H. Wilhelm, assistant general freight agent of the Chicago, Rock Island & Gulf, has been appointed general freight agent, with headquarters at Ft. Worth, Tex., succeeding J. C. McCabe, deceased. M. J. Dowlin succeeds Mr. Wilhelm.

W. A. Scrivner, division freight agent of the Texas & Pacific at El Paso, Tex., has been appointed traffic manager of the Aransas Harbor Terminal Railway, Aransas Pass Channel & Dock Company and Port Aransas Transportation Company at Aransas Pass, Tex.

Henry P. Anewalt, whose appointment as general freight agent of the Atchison, Topeka & Santa Fe Coast Lines has already been announced in these columns, was born January 3,

1868, at Allentown, Pa. He graduated from the high school in Allentown in 1884, and began railway work the following year as clerk and cashier in the local freight office of the Atchison, Topeka & Santa Fe at Kansas City, Mo. He was later successively chief clerk in the commercial office and contracting agent at that place, and subsequently became general freight and passenger agent of the Santa Fe, Prescott & Phoenix at Prescott, Ariz., until April, 1905. He was then appointed assistant general freight agent of the Coast Lines of the Atchison, Topeka & Santa Fe, with office at



H. P. Anewalt.

San Francisco, Cal. He remained in this position until June 1, at which time he was promoted to general freight agent of the Coast Lines, with headquarters at Los Angeles, Cal., as above noted. Mr. Anewalt's entire railway service has been with the Atchison, Topeka & Santa Fe system.

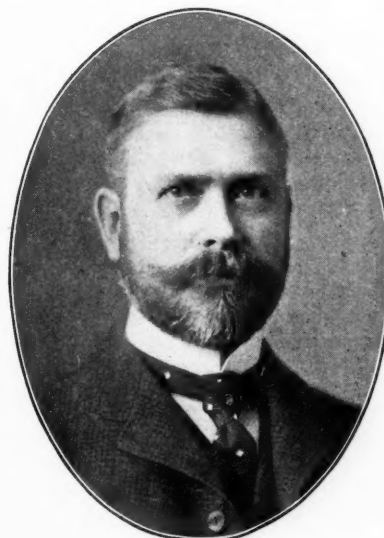
J. M. Ball, district freight agent of the International & Great Northern at San Antonio, Tex., has been appointed general cotton agent, with headquarters at Houston, Tex., and will have charge of matters relative to the transportation of cotton, cotton seed and cotton seed products.

H. A. Fidler having resigned as division freight agent of the Detroit, Toledo & Ironton at Ironton, Ohio, the position is

abolished. E. C. Brooks is appointed general agent at that place, and will have supervision of operation in the Ironton district and charge of traffic in the territory formerly under the jurisdiction of the division freight agent.

J. C. Valentine, traveling freight agent of the Texas & Pacific at Shreveport, La., has been appointed commercial agent of the International & Great Northern at Dallas, Tex., succeeding Cooper Nott, transferred. C. H. Lewis has been appointed traveling freight agent, with headquarters at St. Louis, Mo., in place of C. B. Fox, who will succeed Mr. Valentine as traveling freight agent of the Texas & Pacific.

Wilmer C. Stith has been appointed traffic manager of the Terminal Railroad Association of St. Louis, with headquarters at St. Louis, Mo., succeeding J. L. Penney, assigned to other



W. C. Stith.

duties, effective June 1. Mr. Stith was born at St. Louis, June 21, 1858, and began railway work in August, 1877, as messenger in the general freight office of the St. Louis, Iron Mountain & Southern. He was employed in various capacities in that office, which was afterwards combined with the general freight office of the Missouri Pacific system until September, 1886, when he was made assistant general freight agent of that system. From January, 1890, to January, 1892, he was general freight agent of the Kansas City, Fort Scott & Memphis at Kansas City, Mo. Mr. Stith returned to the

Missouri Pacific system on the latter date as general freight agent, and in December, 1899, was promoted to freight traffic manager. He resigned in April, 1908, to become traffic manager of the Waters-Pierce Oil Company, where he remained for about three years. For the last two years he has been engaged in special traffic and transportation work, the past ten months of which have been spent with the Terminal Railroad Association of St. Louis.

#### Engineering and Rolling Stock Officers.

F. G. Glover has been appointed electrical engineer of the Rock Island lines, with headquarters at Chicago, succeeding F. E. Hutchison, resigned.

Charles Hansel, consulting engineer, New York, has resigned as chief engineer of the Cincinnati Union Depot & Terminal Company, effective June 1.

R. B. Elsworth, assistant signal engineer of the New York Central & Hudson River, at Albany, N. Y., has been appointed engineer maintenance of signals, succeeding J. M. Fitzgerald.

G. O. Hockett, road foreman of the Chicago, Burlington & Quincy at Wymore, Neb., has been appointed master mechanic of the Sterling division, of the same road, with headquarters at Sterling, Colo., in place of H. M. Barr, resigned, effective June 1.

Charles Yoder, assistant engineer of the Lake Shore & Michigan Southern at Cleveland, Ohio, has been appointed assistant engineer of track of the Lake Shore & Michigan Southern and the Dunkirk, Allegheny Valley & Pittsburgh, with headquarters at Cleveland.

V. D. Simar, having resigned as chief engineer of the Duluth, South Shore & Atlantic and the Mineral Range, all matters pertaining to engineering, bridges and buildings will be handled by E. R. Lewis, assistant to the general manager, with headquarters at Duluth, Minn.

P. J. Carter, who resigned last year as office engineer of the Gulf, Colorado & Santa Fe, at Galveston, Tex., to pursue post graduate work at the University of Wisconsin, has recently been appointed office engineer of the western lines of the Atchison, Topeka & Santa Fe, and his headquarters will be at Amarillo, Tex.

G. S. Goodwin, assistant mechanical engineer of the Rock Island Lines, has been appointed mechanical engineer in charge of locomotive design, with headquarters at Chicago, and E. G. Chenoweth has been appointed mechanical engineer in charge of car design, with headquarters at Chicago, succeeding C. A. Seley, resigned, who had charge of both departments. G. W. Lillie succeeds Mr. Goodwin as assistant mechanical engineer at Silvis, Ill. Effective June 1.

L. Jutton, whose appointment as division engineer of the Madison division of the Chicago & North Western, with headquarters at Madison, Wis., has already been announced in these columns, was graduated from the University of Illinois in civil engineering in 1902. For about a year afterwards he was engaged in structural steel work, and in September, 1903, he entered the employ of the Chicago & North Western. He held various positions in the bridge department, and at the time of his recent promotion, as noted above, he was general inspector of bridges, with office at Chicago.

F. H. Hanson, whose appointment as assistant master car builder of the Lake Shore division of the Lake Shore & Michigan Southern, with headquarters at the Collinwood shops, Ohio, has been announced in these columns, began railway work on August 9, 1891, as transfer man on the Lake Shore & Michigan Southern, at Elkhart, Ind. The following year he was made fireman, and in September, 1893, was appointed baggage man at Elkhart. He was subsequently car inspector, night foreman and general foreman at the same place, and in September, 1908, became division general foreman at Collinwood, Ohio. He remained in this position until January 16, 1912, when he was appointed supervisor of materials at Cleveland, which position he held at the time of his recent appointment as assistant master car builder of the same road as above noted.

Edward Douglas Jackson, whose appointment as division engineer of the Baltimore & Ohio, with headquarters at Philadelphia, Pa., has been announced in these columns, was born on July 1, 1882, at Front Royal, Va., and was educated at the Virginia Military Institute. He began railway work on July 1, 1902, with an engineering corps of the Baltimore & Ohio, and in August, 1906, was appointed assistant division engineer at Pittsburgh, Pa. From January, 1907, to April, 1909, he was assistant engineer of the same road at Baltimore, Md., and then to February, 1910, was engineer of the Chicago division. He was appointed assistant engineer in the operating department, with headquarters at Baltimore, in February, 1910, and in November, 1911, was made assistant engineer maintenance of way, at Baltimore, which position he held at the time of his recent appointment as engineer of the Philadelphia division of the same road, with headquarters at Philadelphia, Pa.

#### OBITUARY.

Napoleon Bonaparte Lasier, general baggage agent of the Baltimore & Ohio Chicago Terminal Railroad, died at his home in Chicago on May 27.

Joseph G. Cutler, roadmaster of the Northern Pacific at Walla Walla, Wash., died in the latter city on May 29, aged 55 years. Mr. Cutler was born at Cambridge, Mass., and was graduated from Lawrence Scientific School at Harvard University. He began railway work in 1881 as rodman for the New York West Shore & Buffalo. He was then with the Canadian Pacific, Boston Hoosic Tunnel & Western and Burlington & Missouri River until 1888, when he was made resident engineer of the Washington & Columbia River. In 1893 he was appointed chief engineer, and in 1895, also treasurer, of that road, and later, when the Northern Pacific acquired the Washington & Columbia River, he was made an assistant superintendent. Subsequently he became roadmaster of the branch from Pasco to Walla Walla.

## Equipment and Supplies.

### LOCOMOTIVE BUILDING.

THE SOUTHERN RAILWAY is making inquiries for 15 mikado locomotives and 10 Pacific type locomotives.

THE TRINITY RIVER LUMBER COMPANY has ordered 1 mogul locomotive from the Baldwin Locomotive Works.

THE COAST FISH, OIL & FERTILIZER COMPANY has ordered 1 four-wheel switching locomotive from the Baldwin Locomotive Works.

THE LOUISIANA RAILWAY & NAVIGATION COMPANY has ordered 3 ten-wheel locomotives from the Baldwin Locomotive Works.

### CAR BUILDING.

THE UNION RAILROAD is making inquiries for 296 freight cars.

THE SOUTHERN RAILWAY is making inquiries for 400 fifty-ton hopper cars.

THE ATLANTIC COAST LINE is in the market for 100 flat cars and 25 caboose cars.

THE CAROLINA, CLINCHFIELD & OHIO is making inquiries for a number of coal cars.

THE INTERNATIONAL & GREAT NORTHERN has ordered 1,000 freight cars from the American Car & Foundry Company.

THE LEHIGH VALLEY, mentioned in the *Railway Age Gazette* of May 30, as being in the market for 1,000 box cars and 1,000 coal cars, has ordered 1,000 coal cars from the Standard Steel Car Company, and is negotiating with the Pullman Company for 1,000 box cars.

### IRON AND STEEL.

THE CORDOBA CENTRAL, Argentina, has ordered 10,000 tons of rails from the United States Steel Corporation.

THE NORTH COAST has ordered 2,500 tons of bridge material from the American Bridge Company.

THE NORFOLK & WESTERN has ordered 3,000 tons of bridge material from the United States Steel Corporation.

GENERAL CONDITIONS IN STEEL.—The conditions in the steel industry show no change. Orders have been small and there have been some slight reductions in prices on the part of independent companies to induce consumers to enter the market. The larger companies have, however, shown no desire to take new orders at a sacrifice in prices. A revival in the buying movement is not expected until the early part of next month, as the tariff question will not be definitely settled until that time. It is also believed that consumers will have more confidence in the promising crop outlook in the early part of July, and this should be an important factor in inducing them to place heavy orders.

INDO-CHINESE RAILWAY CONNECTION PROPOSED.—The Burma Chamber of Commerce, backed by those of Liverpool and Manchester, have again moved in the matter of linking up the Indian with the Chinese railways. The route most favored is the one by the Southern Shan States line from Thazi to Taunggyi and into China via Kengtung, as it would pass through fertile land besides affording the easiest route into China.

NEW RAILWAYS FOR CEYLON.—The 17-mile extension railway from Ratnapura to Pelmadulla in Ceylon will soon be completed; in the words of the governor, this line "follows generally the valley of the We-ganga river and taps a large country planted in rubber in the Dele and Watapola districts. It also serves the rich districts of Rakwana and Balangoa." From the present terminus at Kahawatte surveys are being made to Madampi to the south and also one from Mahawatte to Opanaiki. The two extensions to Rakwana and Galangoa are also under consideration. All these lines, when completed, will open out a very fertile country.



## Supply Trade News.

The Orenstein-Arthur Koppel Company, Koppel, Pa., has made the Canadian Fairbanks-Morse Company, Ltd., Montreal, Que., its agents for Canada.

G. Haven Peabody has been appointed to represent the Lima Locomotive Corporation in the west, with headquarters at 520 McCormick building, Chicago.

The Baldwin Locomotive Works has awarded a contract to the H. A. Strauss Co., Chicago, for the heavy concrete construction work on the new plant at East Chicago, Ind.

The D. & A. Post Mold Company, Three Rivers, Mich., has moved into new and enlarged quarters, necessitated on account of the growth of the business, which has recently included several large railway orders.

The Raymond Concrete Pile Company, New York, has received a contract for placing Raymond concrete piles for the foundations of the train shed for the new union passenger station at Kansas City, Mo.

The Roberts & Schaefer Company, Chicago, has received a contract from the Indiana Harbor Belt Railway to build two large reinforced concrete coaling plants at Chicago. The contract price is about \$32,000.

A. C. Moore, general manager of the Safety Car Heating & Lighting Company, New York, has been made vice-president of that company, with office in Chicago. Mr. Moore will have entire charge of the western business of the company.

The McKen Motor Car Company, Omaha, Neb., has just shipped a 70 ft. 200 h. p. steel gasoline motor car to the Oregon-Washington Railroad & Navigation Company, at North Yakima, Wash. The car made the entire trip of 2,000 miles under its own power. The company has also shipped two 55 ft. gasoline motor cars to the Minneapolis & Northern Railway, a 22-mile interurban road from Minneapolis to Anoka, Minn., which has been built for operation exclusively with McKen cars. A 200 h. p. freight locomotive for this line will be delivered shortly.

George L. Hall, vice-president of the Q & C Company, New York, died in that city on June 1, at the age of 46. Mr. Hall was born at Bedford, Pa., on February 25, 1867, and graduated from Princeton University in 1889. For several years he was in the engineering department of the Pennsylvania Railroad, and was later connected with the Baltimore & Ohio. Mr. Hall was afterwards president of the National Railway Materials Company, which position he resigned to become vice-president of the Q & C Company.



G. L. Hall.

The Electric Storage Battery Company, Philadelphia, Pa., has received an order from the Atchison, Topeka & Santa Fe, for 62 sets of the Chloride Accumulator to be used for car lighting, in conjunction with a recent order given by that road to the company for axle lighting generators. These batteries are standard on the Santa Fe.

A conference of the chief inspectors of Robert W. Hunt & Co., having in charge the inspection of rails and fastenings at the various mills of the United States, was held in Pittsburgh on May 13 and 14. At the meeting various matters were discussed relative to the inspection of rails, joints, bolts, spikes and tie plates, the idea being to bring the inspectors into closer contact,

with a view to harmonizing and systematizing the work to the end that more consistent action and results would be attained. Samples of the various types inspected, specifications and report blanks were on exhibition, and the different points were thoroughly discussed. The meeting was in charge of D. W. McNaugher and C. W. Gennet.

### TRADE PUBLICATIONS.

**FROGS.**—The Railway Appliances Company, Chicago, has issued an illustrated folder describing the Fewings Wrecking Frogs.

**MACHINERY.**—MacGovern & Company, Incorporated, New York, has issued a new catalog of electrical and steam machinery, cars and car equipment.

**CHICAGO, BURLINGTON & QUINCY.**—The freight department has issued in booklet form a schedule of package cars from St. Louis, with a description of the company's package car service.

**SIGNALING.**—The Union Switch & Signal Company has just issued bulletin No. 66, describing in detail its apprenticeship course. The bulletin is illustrated with a large number of very fine views of the various departments of the company's works.

**JOINT PIPE.**—The National Tube Company, Pittsburgh, Pa., has issued a 40-page booklet describing Matheson joint pipe, and including numerous half-tones showing installations and methods of laying and joining the pipe. Among the advantages enumerated in the text are the reduced weight of this pipe as compared with cast iron, the additional strength against bursting, the reduction in lead required for jointing, the adaptability of the pipe to sharp curves and the advantages of the burlap and tar coating. The booklet is artistically arranged, and the cuts are finished in duotone.

**CONCRETE CONSTRUCTION.**—The Unit Construction Company, St. Louis, has issued an attractive illustrated booklet on the unit method of construction for reinforced concrete buildings. Unit construction is a patented method of assembling materials and erecting reinforced concrete buildings. It differs from the ordinary method of reinforced concrete construction in that all concrete is cast in forms on the ground in the shape of individual units, which are seasoned and then assembled in place in the building as provided for in the design. The book contains illustrations showing a large number of examples of this type of construction in various large buildings throughout the country.

**OPPORTUNITY FOR RAILWAY CONCESSION IN ECUADOR.**—The Ecuadorian government has practically canceled its contract with Edward Morley for constructing the line from Cuenca, in the southeastern portion of Ecuador, to Huigra. It seems that Mr. Morley has not been able to secure the funds to complete this work. Here is still a good opportunity for some American firm. This road is much needed, and the firm coming forward with the funds to do the work will certainly receive every reasonable concession from the government.—*Consular Report.*

**PASSENGER IRREGULARITIES IN VICTORIA.**—The Victorian Railway Commissioners intend to rigidly enforce the regulations in respect to the prosecution of persons traveling on the railways without tickets and those who use first with second class tickets, etc. This particular form of offence is assuming alarming proportions. An idea of the extent of the habit may be gaged from the fact that in 1910 there were 2,094 passengers traveling with out-of-date tickets and occupying first class compartments with second class tickets. In 1911 the number had increased to 2,919, while in 1912 it rose still higher to 3,599. According to the records for the first three months of 1913 the number is steadily increasing. In January 470 instances were detected, in February 402, and March 499. If this average is maintained the number of punishable offences will have amounted to about 6,000 by the end of the year. The principal excuse of those who travel in a higher class than their ticket provides is that of "overcrowding." Until the electric service is actually started overcrowding will be unavoidable during the rush hours. The offenders in this class will, therefore, receive less punishment than those who travel without a ticket.

## Railway Construction.

**ALABAMA ROADS.**—An officer of the Tidewater Securities Corporation, with headquarters at Birmingham, Ala., writes that this company has been organized with \$100,000 capital, to promote, finance and construct the following: Birmingham & Gadsden.—Under this name a company is to be organized with a capital of \$1,500,000, to build a railroad from Gadsden, Ala., southwest to Birmingham, 60 miles; the Birmingham & Tidewater is to be organized with a capital of \$1,500,000, to build a railroad from Birmingham to the Warrior river, 30 miles; the Tidewater Navigation Company is to be organized with \$1,500,000, to equip a line of steamboats and barges to operate a line on the Warrior and other rivers south to Dauphin Island, a distance of 438 miles, and the Dauphin Island Railway & Harbor Company has been organized with \$1,500,000 capital to develop Dauphin Island as a port and terminal for transportation lines. This company owns Little Dauphin Island and has grants from the United States government to build a railroad and to dredge the harbor. These four projects will provide a route between the Birmingham district and the Gulf. They will be constructed separately, and will be operated as separate units, also as a through line.

**BIRMINGHAM & GADSDEN.**—See Alabama roads.

**BIRMINGHAM & TIDEWATER.**—See Alabama roads.

**BURRO MOUNTAIN.**—See El Paso & Southwestern.

**CANADIAN NORTHERN.**—This company has filed with the city authorities of Toronto, Ont., revised plans for a western entrance into the city. The plans call for the construction of a four-mile line, and include the construction of a 2,360-ft. tunnel to be 30 ft. wide and about 25 ft. deep, from a point just south of Davenport road, east of St. Clarens avenue, to a point just east of Talbot avenue. The tunnel will be built for two tracks with a center wall running through its entire length. The tracks will be depressed to the west and bridges erected over the streets, and the Humber will be crossed on a high level bridge. The new plans were made to avoid crossing a number of streets at grade and the Grand Trunk yards north of St. Clair avenue. The company has asked the Railway Commission of Canada to approve the plans.

**CANADIAN NORTH WESTERN.**—The House of Commons Railway Committee has passed the bill received from the Senate incorporating this company with \$15,000,000 capital to build a railway 1,800 miles long from Winnipeg, Man., to Lethbridge, Alberta, thence to Pas, Man., and back to Winnipeg. H. DeWalden C. Montague of Beaulieu, Que.; F. W. Baker and H. E. Brittain, of London; W. F. Morgan, Jr., New York, and Toussaint Brosseau, Montreal, Que., are incorporators. (March 14, p. 529.)

**CHICAGO & WESTERN INDIANA.**—It is announced that work will be started at once on the elevation of the tracks in Chicago between Seventy-first and Eighty-third streets, in accordance with the ordinance of 1908. This will give the Western Indiana an elevated track from Twenty-second street to Eighty-third street. The tracks of the Belt Railway are also to be elevated from Wood street to Wallace street, making a total of about three miles for the two lines.

**CLEVELAND AKRON SHORT LINE (Electric).**—An officer writes that the plans call for building from Cleveland, Ohio, south via Brooklyn, Independence, Breckville, Richfield, Ira, Old Portage and Akron to Barberton. Henry F. Chapman, president, and W. E. Hawley, chief engineer, Cleveland.

**CORINTH & NORTHEASTERN.**—Incorporated in Mississippi, it is said, to build from Corinth, Miss., northeast to the Tennessee river near Hamburg, Tenn., about 18 miles. A. Rubel, G. A. Hazard, R. L. Young and W. E. Small are directors.

**CUMBERLAND VALLEY.**—An officer writes that bids have been asked for 87,000 yds. of excavation work in connection with a revision of the grade between the Potomac river and Berkeley Station, West Va., a distance of 8 miles. Bids will probably be asked for a single track bridge in the near future, to be built over the Potomac river to replace the present bridge.

**DAUPHIN ISLAND RAILWAY & HARBOR COMPANY.**—See Alabama roads.

**EL PASO & SOUTHWESTERN.**—An officer writes that a grading contract has been given to Chadwick & Dayo, Tucson, Ariz., to build under the name of the Burro Mountain from section 34, township 19 south, to section 22, township 19 south, in New Mexico, about 14 miles. The company will carry out the bridge work and track laying with its own forces. The grading involves handling about 20,000 cu. yds. to the mile, maximum grades will be 2 per cent., maximum curvature 10 deg. (May 29, p. 1205.)

**GADSDEN, BELLEVUE & LOOKOUT MOUNTAIN.**—An officer writes that grading work has been started on the first section from Fisk street, Gadsden, Ala., to Noccalula Falls, 3.1 miles. Address U. J. Virgin, New Orleans, La.

**GRAND MARAIS & NORTHWESTERN.**—An officer writes that the prospects of building this line are good, and the company expects to let contracts about October 1. The projected route is from Grand Marais, Minn., west to a connection with the Duluth & Northern Minnesota, about 50 miles. A number of branch lines are also included in the plans. The line will be built to carry iron ore and forest products. Arthur Mitchell, president, Duluth, Minn. (May 16, p. 1115.)

**GREAT NORTHERN.**—An officer writes that a contract has been given to Grant Smith & Co., for grading and tunnel work on a change of line a quarter of a mile long in the Cascade mountains, state of Washington, replacing two 10 deg. curves with one 5 deg. curve, and piercing a 1,200-ft. double track tunnel. The railway company will carry out the track laying. There will also be a 900-ft. double track combination snowshed. (April 25, p. 973.)

**KANSAS CITY, KAW VALLEY & WESTERN (Electric).**—An officer writes that contracts will be let in 60 days for work on a line from Kansas City, Kan., west, via Bonner Springs to Lawrence, 40 miles. O. K. Williamson, chief engineer, Bonner Springs, Kan.

**LEHIGH VALLEY TRANSIT.**—An officer writes that work is now being carried out on a part of the line between Allentown, Pa., and Philadelphia, removing the present track from a highway to a private right-of-way. A contract for this work has been given to the Allen Engineering & Contracting Company, Netcong, N. J.; it includes work on a section of about 3½ miles north of Quakertown, also on ½ mile south of Sellersville, and on about 3½ miles between Souderton and Lansdale. There will be one steel viaduct about 270 ft. long and 40 ft. high, and several small bridges ranging in length from 20 ft. to 50 ft. The new line will have easier curves and grades than the existing line. All the necessary right-of-way for a double track line has been secured, although only single track will be laid at the present time. (May 9, p. 1052.)

**MINNEAPOLIS, MERRILL & MARINETTE.**—Incorporated in Wisconsin with \$400,000 capital, to build from Merrill, Wis., to Antego, also to build from Merrill to Prentice Junction, in all 75 miles. J. N. Potter, L. V. Anderson, A. H. Wright, E. F. King, E. C. Harding and C. Solum, all of Merrill, are incorporators.

**MOBERLY, HUNTSVILLE & RANDOLPH SPRINGS (Electric).**—An officer writes that contracts were to be let on May 29, for building from Moberly, Mo., via Huntsville to Randolph Springs, 12 miles. The maximum grading will be 3 per cent. C. H. Dameron, president, and John J. Mundinger, chief engineer, Huntsville. (January 3, page 38.)

**NORTH AND SOUTH CAROLINA ROADS.**—Plans are being made to build a line from Rockingham, N. C., south to Cheraw, S. C., about 25 miles. William Gillispie, Cheraw, may be addressed.

**OREGON ROADS.**—According to press reports a contract has been given to Olson Brothers, of Seaside, Oregon, to build a logging line in Clatsop county, Oregon, from a point near Gearhart Park, east to the Lewis and Clark river. It is said that the work will be started at once. M. J. Kinney is back of the project.



**PENNSYLVANIA SYSTEM.**—The record of the mileage of the road on December 31, 1912, shows that the total length of the main line on the lines east of Pittsburgh, Pa., and Erie is 5,333 miles of first track, with 1,888 miles of second track, 551 miles of third track, 483 miles of fourth track, and 4,587 miles of company's sidings, a total of 12,842 miles. There was an increase of 4 miles of first track, 17 miles of second track, 2 miles of fourth track, and 43 miles of company's sidings, a total increase of 66 miles. On the Pennsylvania lines west of Pittsburgh and Erie, the mileage is 3,103 miles of first track, 1,347 miles of second track, 216 miles of third track, 130 miles of fourth track, and 2,577 miles of company's sidings, a total of 7,373 miles. During the year there was an increase of 5 miles of first track, 5 miles of third track, 9 miles of fourth track, and 51 miles of company's sidings, and a decrease of 5 miles second track, a total increase of 65 miles. The mileage of the Vandalia Railroad is 927 miles of first track, 106 miles of second track, 8 miles of third track, and 682 miles of company's sidings, a total of 1,723 miles. The grand total of all lines, including those operated by and associated in interest with the Pennsylvania Railroads, is 11,644 miles of first track, 3,652 miles of second track, 803 miles of third track, 631 miles of fourth track, and 8,965 miles of company's sidings, a total of 25,695 miles. Of this 6,338 miles of first track is east of Pittsburgh and Erie, and 5,306 miles is west of Pittsburgh and Erie.

**PEORIA, CANTON & GALESBURG (Electric).**—An officer writes that contracts will probably be let in June to build from Peoria, Ill., west to Farmington, 25 miles, thence northwest to Galesburg, an additional 25 miles. Horace Clark, president, Peoria, and L. L. Summers & Co., chief engineers, Chicago. (May 9, p. 1052.)

**PHILADELPHIA & READING.**—An officer writes that a contract has been given to C. P. Bower, Reading, Pa., for the grading and masonry work on a new low-grade freight line in Philadelphia from a point between the Germantown branch crossing of the Richmond branch, and Clarissa street bridge over the Richmond branch. The new line is being built to improve the conditions at Wayne Junction station, and will eliminate the heavy grades on the existing yard tracks south of the station.

**QUANAH, ACME & PACIFIC.**—This company has completed work on the extension from Paducah, Tex., west to Roaring Springs, 42 miles, and has been authorized by the State Railroad Commission of Texas to issue \$300,000 of bonds on the extension. Surveys are now being made, it is said, for the extension west across the Panhandle of Texas to Roswell, N. Mex. It is understood that the line will eventually be extended from Roswell southwest to El Paso, Tex. (February 21, p. 374.)

**TEMPLE, NORTHWESTERN & GULF.**—This is the new name of the Temple & Northwestern, which has about four miles of track laid from Temple, Tex. The new company has a capital of \$100,000, with headquarters at Temple, and plans to build from a point four miles west of Temple northwest via Gatesville to Dublin, thence northeast to Dallas. The incorporators include J. H. Thompson, J. Lane, R. O. Faires and W. A. Vinson, all of Houston, and J. H. McGregor, of Temple. (February 28, p. 412.)

**TIDEWATER NAVIGATION COMPANY.**—See Alabama roads.

**VIRGINIAN RAILWAY.**—An officer writes that a contract for the construction of a tunnel for two tracks and revision of alignment through Jennys Gap between Lester and Slab Fork in Raleigh county, W. Va., has been let to W. W. Boxley & Co., Roanoke, Va. In regard to double tracking the line for a distance of four miles, with additional side tracks for the storage of coal, no contract has been let for this work.

#### RAILWAY STRUCTURES.

**BALTIMORE, MD.**—President Samuel Rea of the Pennsylvania Railroad has submitted plans to the city authorities of Baltimore for improvements to the Northern Central Railway terminals in the valley of Jones' Falls, north of Bath street. It is proposed that the Calvert street facilities should be used for freight service exclusively, but if the city favors the retention of a passenger service, the railway company will later include as part of the plan such facilities as would adequately accommo-

date the local passenger traffic, and at the same time interfere as little as possible with the development for freight purposes. In that event, it would be necessary to elevate such passenger facilities alongside of Calvert street and over the freight tracks down to a new terminus on the north side of Bath street at Calvert street, and there put up a building suitable both for freight and passenger service, the latter on the upper level. It would also be necessary to arrange the freight houses so that in the future their second stories may be utilized as well as the first stories at the track level. The plans for this terminal, exclusive of passenger facilities, contemplate a four-track connection from the Union station down the valley of Jones' Falls. They also include enlarged freight sheds and carload delivery tracks, and to carry out this work would necessitate the vacation of a large number of streets. The plan also calls for the construction of an overhead bridge 50 ft. wide, south of Madison street, extending from Calvert to Constitution. The necessary properties involved in this new development, not previously owned by the Northern Central, have been acquired or are in process of acquisition, at an estimated cost of over \$1,000,000.

**BERKELEY, W. VA.**—See Cumberland Valley under Railway Construction.

**KANSAS CITY, Mo.**—The Kansas City Southern is planning the erection of a six-story office building.

**PENSACOLA, FLA.**—An officer of the Gulf, Florida & Alabama writes that bids will probably be asked for this fall to build a two-story passenger station and office building at Garden and Coyle streets in Pensacola. The building is to be 45 ft. wide x 150 ft. long; it will have brick walls, stucco covered, and reinforced concrete floors. The cost of the improvements will be about \$50,000.

**PITTSBURGH, PA.**—The West Penn Railroad has plans made for building a large freight station at North Side, Pittsburgh. To carry out the improvements it will be necessary to erect overhead bridges over two streets.

**TEMPLE, TEX.**—The Atchison, Topeka & Santa Fe is preparing to begin work shortly on the erection of a new freight depot, transfer sheds and platforms.

**TORONTO, ONT.**—The plans for extensive railway improvements in Toronto, long the subject of controversy, are again changed in a bill introduced in the Canadian Parliament by Hon. Frank Cochrane. The parties in interest are the Grand Trunk and Canadian Pacific Railways and the Toronto Harbor Commissioners. The plan for a four-track viaduct has been abandoned, and the Railway Commission will issue an order for a six-track viaduct, close to the water's edge. The bill authorizes the different parties concerned to expropriate property between the tracks and the water. It provides that the railways, for the purpose of the viaduct and connected works or for carrying out any agreement in respect thereto, and approved by the Railway Commission, may expropriate: "All or any land and lands covered by water in the city of Toronto, lying within the district south of the existing right of way of the Canadian Pacific, from Yonge street east to the line of Berkeley street, and south of the existing right of way of the Grand Trunk from the Berkeley street line, east to Cherry street and extending out to the present Windmill line; and also a strip of land south of the Windmill line and extending to Cherry street."

**WINCOSKI, VT.**—Bids are wanted until June 10, by J. M. Morrison, engineer and superintendent of structures of the Central Vermont, at St. Albans, Vt., for a bridge to be built at Winooski, Vt., near Burlington, for the Central Vermont and the towns of Colchester and South Burlington. The proposed design is a reinforced concrete arch and viaduct for carrying the highway over the Winooski river and over the Central Vermont tracks. The estimated cost is \$20,000.

**PROPOSED LINE FOR INDIA.**—At the last annual meeting of the Mysore Planters' Association, a resolution was passed urging on the secretary of state the necessity for bringing force to bear on the government of India to sanction the construction of the section, running from the Mysore frontier to Mangalore, a distance of but 50 miles. The Mysore state is rapidly developing railways within its boundaries.

## Railway Financial News

**BALTIMORE & OHIO.**—The Public Service Commission of Maryland has approved an issue of \$10,000,000 equipment trust 4½ per cent. certificates, maturing in ten annual instalments.

**CHICAGO, ROCK ISLAND & PACIFIC.**—White, Weld & Company, New York, have bought and are offering \$4,410,000 5 per cent. equipment notes, series H, maturing \$441,000 annually from July 1, 1914, to July 1, 1923, at prices to yield 5½ per cent. for equal amounts of each maturity. These equipment notes are a direct obligation of the C. R. I. & P. Railway (old company) and are secured by 50 mikado locomotives, 30 six-wheel switching locomotives, 30 Pacific type locomotives, 2 mountain type locomotives, 1,500 forty-ton steel under-frame box cars, 500 steel gondola cars, 50 caboose cars and 72 steel passenger train cars, costing \$5,521,000, of which the railway paid 20 per cent. in cash.

**GRAND TRUNK PACIFIC.**—The Canadian government has agreed to lend, at 4 per cent., \$15,000,000 to the Grand Trunk Pacific, which loan is to be guaranteed principal and interest by the Grand Trunk. The agreement is subject to ratification by the Canadian parliament.

**KANSAS CITY, FORT SCOTT & MEMPHIS.**—See St. Louis & San Francisco.

**MISSOURI PACIFIC.**—United States representative Neely, of Kansas, has requested President Wilson to have the attorney general begin proceedings against the Missouri Pacific to recover \$4,500,000 for government aid said to have been extended to the Missouri Pacific in 1862.

**NATIONAL RAILWAYS OF MEXICO.**—Kuhn, Loeb & Company, Speyer & Company, and Ladenburg, Thalmann & Company, all of New York, have bought from the railroad company and are offering to the public \$26,730,000 2-year 6 per cent. secured gold notes. The offering price to the public is 97. These notes are part of an authorized issue of \$29,160,000, which is to be secured by the pledge pro rata as notes are issued of \$24,800,000 National Railways prior lien 4½ per cent. bonds and \$17,000,000 National Railways general mortgage 4 per cent. bonds, which 4 per cent. bonds are guaranteed principal and interest by the Mexican government. The proceeds of the sale of these notes was used by the company to pay the \$10,000,000 notes which matured June 1, 1913, and further proceeds will be used to take up \$13,000,000 notes due November 15, 1913. A part of the security for the new notes is now deposited as security for the \$13,000,000 notes due November 15.

**NEW ORLEANS, MOBILE & CHICAGO.**—A protective committee for the first and refunding mortgage 5 per cent. bonds, consisting of John W. Platten, chairman; Robert Fleming, James G. Cannon, F. W. Scott and T. N. Strothers, has been formed. The St. Louis & San Francisco and the Louisville & Nashville jointly are understood to control this road.

**PERE MARQUETTE.**—Judge Landis, of the United States district court, has given permission to the Bankers Trust Company, New York, to bring foreclosure proceedings under the mortgage securing the \$17,295,000 improvement and refunding first mortgage bonds. This suit is to be consolidated with that of the American Brake Shoe & Foundry Company, under which Frank W. Blair was appointed receiver.

**ST. LOUIS & SAN FRANCISCO.**—The following is a list of the protective committees which have been formed for various classes of St. Louis & San Francisco securities:

For the general lien 15-20 year 5 per cent. bonds of the St. L. & S. F., Speyer & Company, New York, ask the deposit with the Bankers Trust Company, New York.

For the refunding 4 per cent. bonds of the St. L. & S. F., Frederick Strauss, of J. & W. Seligman & Co., chairman; James N. Wallace, president of the Central Trust Company; A. J. Hemphill, president of the Guaranty Trust Company; Edwin G. Merrill, president of the Union Trust Company; Harry Bronner, of Hallgarten & Company; Charles W. Cox, of Robert Winthrop & Company; Breckenridge Jones, president of the Mississippi Valley Trust Company of St. Louis.

For the New Orleans, Texas & Mexico first mortgage 5s, Willard V. King, president of the Columbia-Knickerbocker Trust Company, chairman; Stedman Buttrick, of Estabrook & Company, Boston; Lewis L. Clarke, president of the American Exchange National Bank; C. A. de Gersdorff, of William Salomon & Co.; Lewis B. Franklin, vice-president of the Guaranty Trust Company; A. Lichtenstein, of Heidelberg, Ickelheimer & Company; C. S. W. Packard, president of the Pennsylvania Company for Insurances on Lives & Granting Annuities, of Philadelphia. George E. Warren, of New York, is secretary of the committee.

For 2-year 6 per cent. debenture notes due September, 1914: H. E. Cooper, vice-president of the Equitable Trust Company, chairman; Charles T. Rhodes, vice-president of the Girard Trust Company of Philadelphia; T. A. Whelen, Jr., of Whelen, Duer & Lanahan, of Baltimore, with A. Ludlow Kramer, of 37 Wall street, as secretary.

For the trust certificates for Chicago & Eastern Illinois stock and stock itself: 1. For trust certificates representing either common or preferred stock of the C. & E. I.—Henry H. Porter, Alvin W. Krech and Harry A. Vernet, committee, with Richard R. Hunter, secretary, request immediate deposit of trust certificates and also stock certificates with the Equitable Trust Company, 37 Wall street, New York, depository. 2. For trust certificates representing only preferred stock of C. & E. I.—W. Emlen Roosevelt, chairman; Horace J. Morse, Joseph Walker, Jr., Otto T. Bannard, W. P. Bliss and W. Redmond Cross, committee, with George E. Roosevelt, secretary, 30 Pine street, New York. Holders either of C. & E. I. preferred stock or stock trust certificates issued for the same will be asked to deposit with the New York Trust Company, 26 Broad street, New York, as depository.

For the Kansas City, Fort Scott & Memphis bonds: E. V. R. Thayer, chairman; F. L. Higginson, Francis R. Hart, Alfred D. Foster and Frank H. Damon, secretary, 50 State street, Boston.

The Interstate Commerce Commission has been asked by representatives of some of the holders of St. Louis & San Francisco securities to make an investigation into the use of the proceeds of the bond sales in recent years of the St. L. & S. F.

The syndicate formed for the sale of New Orleans, Texas & Mexico 5 per cent. bonds was dissolved on June 2, and it is understood that considerable amounts of these bonds remain unsold in the hands of the syndicate members.

See also New Orleans, Mobile & Chicago.

**SAN ANTONIO, UVALDE & GULF.**—The Texas railroad commission has placed a valuation of \$3,093,985 on the road which is now in operation from San Antonio to Carrizo Springs, with main line and branches totaling 197 miles.

**UNION PACIFIC.**—The directors have proposed two plans to meet the requirements of the Supreme Court's decision in regard to the sale of Southern Pacific stock, either of which they announce they are ready to carry out. The first plan provides for the sale of the \$126,650,000 stock of the Southern Pacific at public auction, with a minimum price fixed, and provision made for underwriting the sale. The second plan proposes to deposit this Southern Pacific stock with a bank or trust company without, however, giving any voting power to the stock, and providing that the trustee shall issue beneficial certificates without voting power, but entitled to dividends issuing these certificates pro rata to Union Pacific stockholders. These certificates are to be exchangeable for Southern Pacific stock upon affidavit that the holder is not a holder of any Union Pacific stock. This means that the Union Pacific stockholder who receives such certificates may sell his Union Pacific stock and then be entitled to Southern Pacific stock itself or may sell the beneficial certificate to a non-holder of Union Pacific stock, who will be entitled to exchange it for Southern Pacific stock.

**WABASH-PITTSBURGH TERMINAL.**—The United States district court has authorized the sale of \$4,000,000 new receiver's certificates. The \$1,700,000 receiver's certificates due June 1 were provided for, and the balance is to be used to settle a claim of the Wabash Railroad for \$2,250,000.

**WABASH RAILROAD.**—See Wabash-Pittsburgh Terminal.